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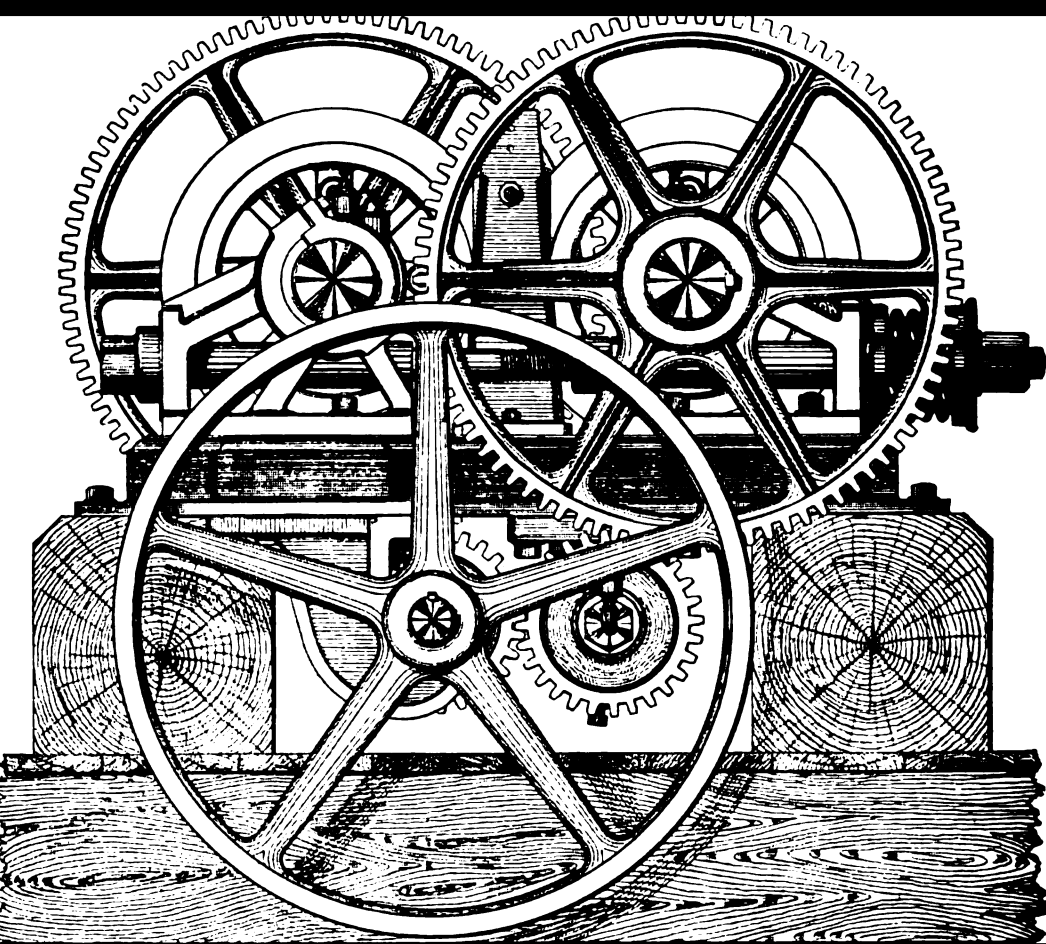
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(1875-'76.)

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Volume 2..No. 1, part 2, War, parts 1, 3, 4, and 2, volumes 1 and 2.	Volume 10..Nos. 32 to 88 inclusive, except No. 81.
Volume 3..No. 1, parts 3 and 4, (Navy and Postmaster.)	Volume 11..No. 81, Coast Survey.
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Volume 5..No. 1, parts 6, 7, 8, 9, and Nos. 7 to 13 inclusive.	Volume 13..No. 124, Commerce and Navigation.
Volume 6..No. 2, Treasury.	Volume 14..Nos. 159 to 195 inclusive, except Nos. 166 and 191.
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FOR THE

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STATISTICS
OF
MINES AND MINING
IN THE
STATES AND TERRITORIES WEST OF THE ROCKY MOUNTAINS;
BEING THE
EIGHTH ANNUAL REPORT
OF
ROSSITER W. RAYMOND,
UNITED STATES COMMISSIONER OF MINING STATISTICS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1877.

LETTER
FROM THE
ACTING SECRETARY OF THE TREASURY,
TRANSMITTING
The report of the Commissioner of Mining Statistics.

APRIL 13, 1876.—Referred to the Committee on Mines and Mining, and ordered to be printed.

TREASURY DEPARTMENT, *April 13, 1876.*

SIR: I have the honor to transmit herewith the report of Rossiter W. Raymond, Commissioner of Mining Statistics.

Very respectfully,

CHAS. F. CONANT,
Acting Secretary of the Treasury.

HOB. M. C. KEER,
Speaker of the House of Representatives.

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INTRODUCTORY.

WASHINGTON, April 11, 1876.

SIR: I have the honor to transmit herewith my report on mines and mining in the States and Territories of California, Nevada, Idaho, Oregon, Montana, Utah, Colorado, Wyoming, New Mexico, and Arizona, for the year ending December 31, 1875. This year was generally a prosperous one for the gold and silver mining industry, although several untoward events diminished the product of bullion in comparison with what might have been expected from a perfectly successful season. Chief among these were the disastrous fire at Virginia City, Nev., in October, which destroyed the machinery of three principal mines on the Comstock lode, and the scarcity of water-supply in California, affecting both the placer and hydraulic mines, and also, to some extent, the quartz-mines of California, many of which are dependent upon stamp-mills run by water-power. The scarcity of water did not however amount to a drought, but rather to a shortening of the working season, an effect which was aggravated somewhat by the extreme cold of the early part of the year.

From the best attainable authorities, I estimate the product of gold and silver in the United States for the year 1875 to have been as follows, in United States coin value:

California	\$17, 753, 151
Nevada	40, 478, 369
Idaho	1, 750, 000
Oregon and Washington.....	1, 246, 978
Montana	3, 573, 600
Utah.....	3, 137, 688
Colorado	5, 302, 810
New Mexico	325, 000
Arizona	750, 000
All other sources.....	500, 000

74, 817, 596

The authorities upon which this estimate is based are given in the respective chapters of the report, and in the appendix will be found a statement of the product of former years compared with that of 1875.

The most striking new developments of the year were those connected with the great *bonanza* in the California, Virginia Consolidated, and Ophir Mines on the Comstock lode. Besides these, the State of Nevada furnished several other important discoveries, such as the *bonanza* of the

Northern Belle Mine, in Esmeralda County, and the new, large, and rich ore-body found in the Eberhardt and Aurora Mine, in White Pine County, at the greatest depth yet attained in the mines of Treasure Hill. From Inyo County, California, the discovery of rich argentiferous lead-ores is reported in the New Coso district. It is affirmed that one of the mines in this district is the famous "Gun-sight lode," so named because, according to a legend current for many years upon the Pacific Coast, it was first discovered by a party of famishing overland emigrants, who melted silver out of the outcropping ore to make sights for their rifles, but who, being obliged by want of food to leave the place, could never find it afterward. The search for this lost lode has been prosecuted by many a prospector during the last twenty-five years, and it may be confidently predicted that if the mine now declared to be the true "Gun-sight" should fail to prove "fabulously rich," its identity will be at once denied, and the zealous pursuit of the genuine, original deposit will begin again; for it is only by its fabulous richness that this vein will ever be recognized.

The San Juan region in Colorado has been steadily growing in importance during the year, and is evidently destined to become the seat of an active and productive silver-mining industry, including smelting as well as amalgamating works. Some of the districts yield gold.

Of improvements in the metallurgy of the West, I would mention particularly, as a considerable advance, the introduction and extended use of water-jackets around the smelting-zone of lead-smelting blast-furnaces. This is specially advantageous in Utah, where fire-proof materials are of indifferent quality and very costly. The jackets are usually of cast-iron, but wrought-iron ones have been introduced at several works. The danger of explosions caused by the formation of steam in the closed jackets first employed has led to the construction of such as are partly open at the top. There is undoubtedly a loss of heat in such appliances; but it cannot possibly be so great, in lead-smelting at least, as to counterbalance the great advantage of preserving the interior lines of the furnace, prolonging the campaign, and decreasing the serious item of cost in repairs. With the view of diminishing the waste of heat, it is customary to run the water through tuyeres and jacket just fast enough to keep it almost boiling. Hence the danger of steam-explosions, which, as I have said, is obviated by using jackets not tightly closed.

This principle of cooling by means of water the surfaces of metallurgical apparatus exposed to the highest temperatures is one of the most important in modern metallurgy. It is destined to complete the revolution in that art which the invention of the Siemens furnace inaugurated. The latter invention made constant high temperatures feasible in metallurgical practice; but, although in the Siemens furnace the heat is concentrated upon its work and measurably directed away from the furnace-walls, yet its intensity is so great as to make repairs of the furnace frequently necessary. The cooling of all these parts and of the

hearth-walls of iron blast-furnaces with water is, in my judgment, almost certain to be the practice of the future, and to constitute the solution of what has been called the problem of fire-proof materials. That is to say, we are to meet the high temperatures of modern metallurgy, not by inventing new and even refractory materials, but by effectively cooling and thus preserving the apparatus built of such materials as we have.

An interesting application of this principle has been made by Mr. Steitz at the Saint Louis Smelting and Refining Works, in the cupellation of rich lead upon an iron hearth, kept cool with water, instead of a hearth of bone-ash, according to the immemorial practice. This improvement offers several advantages. Much labor is saved in the preparation of cupels. There is no danger of losing the charge through a defective cupel, or by unskillful handling. There is no difficulty about drawing off the litharge. Above all, there is no chance for a dishonest workman to steal fine silver, for the silver cannot be cupelled on the iron hearth to perfect fineness. That can be done on a bone-ash cupel only, the porous material of which absorbs the last portion of the litharge. Hence the argentiferous lead is cupelled with successive additions of lead on the English plan, until the full charge is on the iron hearth and has reached a certain degree of fineness. This is then removed to a bone-ash cupel, and refined in the ordinary manner, the superintendent or other trusty overseer being present throughout this final operation. When the cupellation is, on the other hand, carried on upon an English bone-ash hearth throughout, it is possible for the workmen at any time, in the absence of the overseer, or by the connivance of a corrupt overseer, to allow the bath to become fine, abstract a portion of silver from it, and then resume the regular addition of lead, leaving no trace of the robbery. The stealing half-refined bullion from the bath on the iron cupel is an operation to which no workman is tempted, since it is nearly impossible to dispose of such material without detection, almost the only buyers of it being parties who would at once be able to trace and willing to report the theft. Mr. Steitz's very useful improvement will doubtless be introduced, sooner or later, in all silver-reduction works, unless its continued use in practice should develop some disadvantage not now foreseen.

The complete and interesting system of metallurgical processes administered at the Boston and Colorado works, in Colorado, is fully described and illustrated in the present report, which contains also practical hints of importance from trustworthy experts concerning methods and apparatus now in successful use in the West. The professional gentlemen to whom I am indebted for these chapters, as well as those who have contributed to the statistical and descriptive account of the mines, are named in connection with their contributions in the body of the report.

In view of the circumstance that this report, like several of its pred-

ecessors, contains a number of chapters which have appeared, or will appear, as papers in the Transactions of the American Institute of Mining Engineers, I think it well to repeat the explanation made in a previous volume, that the authors of these papers prepared them at my request and without expense to the Government, on condition that they should be free to lay them before the Institute also, as a special and professional public, while the council of the Institute, in which the copyright of all papers is vested, has pursued the wise and liberal policy of permitting their free publication for the benefit of all persons interested in such subjects.

Since this report is the last which I shall have the honor to submit to the Department, I take this opportunity to renew my thanks to the large number of my professional colleagues and of other citizens to whose cordial assistance the value of this series of publications is chiefly due. The means at the disposal of the Commissioner would have been ludicrously inadequate to his work without such co-operation. Even this hearty and general aid has not fully supplied the lack of a thoroughly organized, paid, and responsible corps of reporters. But I think it may be said that no public documents have ever been prepared at so little expense which contained so much information of practical importance to the Government and the country. I am justified in believing, also, that these reports have been influential in producing and advancing improvements in mining and metallurgical practice by which much money has been saved to those industries.

My sincere acknowledgments are due also to the Treasury Department, and to the Director of the Mint, since my work was placed under his supervision, for the enlightened support extended to me in the execution of such plans as the means at disposal permitted me to form. It is not without regret that I terminate the public labors represented by these eight volumes. I trust that in this form, or a better one, the work may be resumed by other and abler hands; and I shall be well content to have contributed something, however imperfect, to the progress and prosperity of the country in that department to which, by profession, I am attached.

Very respectfully, your obedient servant,

R. W. RAYMOND,

U. S. Commissioner of Mining Statistics.

Hon. CHAS. F. CONANT,

Acting Secretary of the Treasury,

Washington, D. C.

PART I.

CONDITION OF THE MINING INDUSTRY.

1 M

CHAPTER I.

CALIFORNIA.

Mr. W. A. Skidmore, of San Francisco, who has been for many successive years my deputy in this State, has manifested this year, as heretofore, great zeal and industry, coupled with skill and tact, in the collection of materials for my report. His efforts have been seconded by the friendly co-operation of many gentlemen, whose names are mentioned with due credit in the following pages. In addition to the statements of this chapter, some industrial and commercial statistics of California will be found in the chapter of miscellaneous statistics at the end of this volume.

The product of bullion, as given by Mr. Valentine, superintendent of Wells, Fargo & Co.'s express, was as follows:

Gold dust and bullion by express.....	\$14,842,010
By other conveyance	1,484,201
Silver bullion by express.....	387,768
Ores and base bullion by freight.....	1,039,172
Total, (coin value).....	17,753,151

Such details of production as could be obtained by correspondence or personal inquiry will be found under the heads of the respective counties. The water-supply for placer-mining was in general deficient.

Of new metallurgical processes which have attracted attention during the year in California I need say little in this place. The most famous is the Fryer process, which has been passing for many months through experimental stages in works erected for the purpose near Grass Valley. Probably much has been claimed for this method by enthusiastic reporters, which would not be seriously expected of it by its manager and owners. So far as it is not kept secret, it embraces simply roasting and amalgamation, and has been applied chiefly to gold-ores. The roasting is effected in a peculiar water-jacketed furnace or kiln, with a removable bottom; the amalgamation takes place in a cylinder, or set of cylinders, set radial to the axis of revolution, like the spokes of a wheel. It is said also that a heavy die or loose piston slides from end to end of the cylinder as it revolves, thus crushing or grinding, as well as mixing, the pulp. Reports of results from numerous small lots of ore tested in this apparatus have been extremely favorable. That such reports, however, are not trustworthy indications of the working value of a new process has been abundantly shown. In the first place, both parties to such a test are frequently interested in a favorable result: the ore-owner, because it may lend new value to some hitherto refractory and unprofitable material; the process-owner, because it may enlarge the field of his operations. They may be sincere and honest, but they are sure to be sanguine, and to overlook rather than take pleasure in detecting slight indications of trouble or loss. In the second place, the con-

ditions of such a test are usually overfavorable to the process. No account is taken of the wear of machinery. Often surplus labor and fuel are employed, and always greater care is bestowed than would be the case in steady running on a large scale. The results, moreover, are compared with "the ordinary process," a vague term, which usually means the method unsuccessfully tried on similar materials previous to the test. I have frankly expressed, as an individual, in another place my doubts of the advantages claimed for the Fryer process—doubts based upon the apparently ineffective and costly roasting-apparatus and upon the apparently unnecessary devices for securing a "close" amalgamation, such amalgamation having been frequently effected already by simpler arrangements, and having usually cost more than its admitted advantages would counterbalance. The test of experiment is, however, the best; and as Mr. Fryer is continuing to perfect the details and operations of his works, it would be both unnecessary and ungracious to judge him in this report upon *a priori* grounds.

Another process which is said to have attracted much notice in California is the Mindelegg process for treating copper ores. The process proper deals with oxidized ores only; but the inventor purposes to bring out also a special roasting-furnace, by means of which he can suitably prepare sulphides. The reduction is to be effected by light hydrocarbon procured from illuminating-gas, by means of which the copper will be reduced to the metallic state, to be subsequently extracted and refined. The objections to the plan are that a direct smelting of oxidized ores to black copper would be cheaper and simpler; that the reduction by gas would include the oxide of iron as well as of copper, leaving iron-sponge in the ore, which would greatly complicate the subsequent treatment; that if gas-reduction were practicable, carbonic oxide would be much cheaper and probably better than hydrocarbon; and, finally, that the process offers no advantages in treating very poor and sulphurous ores, which is the chief direction in which improvements are needed.

QUICKSILVER.

The annual report for 1875 of Mr. J. B. Randol, superintendent of the New Almaden Quicksilver Company, presents so complete a view, not only of the operations of the company, but also of the conditions of quicksilver-mining in California, the nature and amount of expenses, and the course of the market, that I quote it and the tables which accompany it with slight condensation only.

The net receipts for the period named were:

From sales of * 13,353 flasks of quicksilver.....	\$661,657 77
From advances on quicksilver consigned.....	57,600 00
From interest and discounts on deposits and purchases.....	3,394 66
From rents and privileges.....	20,241 44
From profit on materials sold.....	1,229 73
From woodlands, profit on wood cut.....	2,106 71
	746,230 31
From credits to New York office for materials and supplies purchased east	2,846 50
Total net receipts.....	749,076 81
Balance cash in hands of the manager to the company's credit, December 31, 1874.....	15,364 99
Total.....	764,441 80

* Includes 30 flasks lost by fire in Virginia, Nev.

The net expenditures during the year were:

For materials and supplies.....	\$134,699 24
For mine pay-rolls.....	324,577 21
For hacienda pay-rolls.....	57,181 23
For improvement pay-rolls.....	25,051 76
For miscellaneous expenses and taxes.....	26,539 65
For miscellaneous property.....	4,700 84
For woodlands.....	1,569 14
Total expenditures.....	574,309 07
For remittances to New York office, including premiums on exchange....	135,675 00
Total disbursements.....	709,984 07
Balance cash in hands of manager to the company's credit December 31, 1875.....	54,457 73
Total.....	764,441 80

Compared with last year, the net receipts, \$749,076 81, exhibit a decrease of \$181,966.99; the net expenditures, including remittances to New York, an increase of \$7,153.78; and the sales of quicksilver reported were 13,353 flasks, of 76½ pounds each, netting \$661,667.77, against \$815,320.72 for 9,475 flasks sold in 1874.

The quicksilver on hand December 31, 1875, exhibits a decrease of \$63,270, the ore, an increase of \$20,098.60; materials and supplies, an increase of \$14,374.81; cash, an increase of \$39,092.74; a total net increase of assets to the amount of \$10,296.15.

The improvements made at the mines and furnaces were on an extensive scale, and of a character to add largely to the productive capacity of the works. A new engine, 16 by 30, was erected at the Randol shaft, the iron-clad furnace mentioned in the last report was completed with condensers, roofs, &c., and started in operation at a total cost of \$19,727.39. No. 5 furnace was altered to roast tierras without the expense and delay of making them into adobes, the plans were prepared for a new furnace for the same object, with a daily capacity of 30 tons, and the condensers for the same were partly built; work was commenced on an iron-clad furnace, the duplicate in every respect of the one now working so successfully, and new condensers were added to the several old furnaces, which were also improved by the prolongation of flues, increasing height of chimney-shaft, &c. A new boarding-house was built at the hacienda, to replace one destroyed by an incendiary fire, and the number of tanks, reervoirs, flumes, hose, and pipes, for protection against fire, were increased and made more efficient. The aggregate of these expenditures for the current year were \$52,650.56, showing an increase of \$7,331.58 over 1874.

The following is a statement of the amounts expended on the several works:

FOR THE MINES.

Hoisting-engine, pumping-gear, foundations, &c.....	\$10,894 32
Sheds over planillas at Day tunnel and Deep Gulch tunnel and house on hill.....	1,504 56
Roads.....	726 79
	13,125 67

FOR THE HACIENDA.

Iron-clad furnace, No. 7.....	\$15,419 65
Iron-clad furnace, No. 9.....	303 49
Tierras furnace, No. 8.....	1,902 61
Altering No. 5 to tierras furnace.....	3,176 77
Wooden condensers, No. 5.....	1,572 05
Brick condensers, No. 5.....	1,831 54
Elevating chimney, No. 5.....	678 07
Brick tower and flume, Nos. 1 and 2.....	1,850 97
Wooden condensers, No. 1.....	635 70
Iron condensers, No. 6.....	1,737 26
Prolongation of flues, Nos. 3, 4, and 6.....	2,969 87
Adobe store-house.....	692 70
Coal-sheds.....	126 31
Roofing, ore, and tierras chutes.....	357 30
Tanks, flumes, hose, and pipe.....	2,755 14
Boarding-house.....	3,515 46
Total.....	39,524 89

6 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

The total earnings and expenses of the mines for 1875 were as follows:

EARNINGS.

From 13,648 flasks of quicksilver, the production of 1875.....	\$680,567 37
Of this quantity—	
11,563 flasks were sold at current market rates, netting.....	586,937 37
1,884 flasks are consigned to Thomas Bell, esq., upon which Advances have been had.....	\$57,600 00
And it is estimated that the amount realized over ad- vances will be.....	26,685 00
171 flasks are on hand at the hacienda, estimated value.....	84,285 00
30 flasks were destroyed by fire at Virginia City, October 26, 1875, and are credited, estimated value.....	7,695 00
	1,650 00
13,648 flasks.....	680,567 37
Ore-account increased.....	20,098 60
Rents and privileges.....	20,241 44
Miscellaneous sources.....	5,161 96
Total net earnings.....	726,069 37

EXPENSES.

Hacienda pay-rolls.....	57,181 23
Mine pay-rolls.....	324,577 21
Miscellaneous expenses, including taxes.....	26,539 65
Miscellaneous property.....	4,700 84
Materials and supplies consumed for current use of mines and furnaces.....	92,715 63
	505,714 56
Leaving net earnings, 1875.....	220,354 81
Deduct for difference between estimated value of 1,760 flasks on hand December 31, 1874, and amount realized.....	22,929 60
For 30 flasks destroyed by fire.....	1,650 00
	24,579 60
Balance to credit income account 1875.....	195,775 21

Compared with 1874, the production of quicksilver exhibits an increase of 50 per cent.; in the quantity sold of this year's product, an increase of 75 per cent., and the amount on hand December 31, 2,055 flasks, an increase of 295 flasks.

The net value of the quicksilver product of 1874, after deducting for overestimated value of quantity in hand at close of that year, averaged \$98.80½ per flask, and deducting from the expenses the increase in ore-account and amounts to credit of rents and miscellaneous sources, its cost was \$43.85 per flask. The product of 1875 shows a net value of \$49.86½ per flask, with a cost of \$33.72 per flask; this exhibits a decline in net value of \$48.94½ per flask, or 50 per cent., accompanied by a decreased cost of \$10.13 per flask. The course of prices for quicksilver was rapidly downward for the first quarter of 1875, and low prices were current for the remainder of the year. The appended statement gives the highest and lowest prices per pound in San Francisco, as shown by our sales accounts for the several months of the year, and table No. 1 of this report shows changes of prices in London and New York for the same period.

	Highest.	Lowest.
January.....	\$1 55	\$1 55
February.....	1 40	1 40
March.....	1 60	0 70
April.....	0 70	0 65
May.....	0 65	0 65
June.....	0 70	0 65
July.....	0 70	0 70
August.....	0 70	0 70
September.....	0 75	0 65
October.....	0 85	0 70
November.....	0 70	0 65
December.....	0 70	0 62½

Opening, \$1.55 per pound, equal to \$119.57½ per flask.

Closing, \$0.62½ per pound, equal to \$47.81 per flask.

Range, \$0.92½ per pound, equal to \$70.76 per flask.

On the company's product for the year, 13,648 flasks, the difference in price is equal to \$65,732.48.

The causes for the great decline in value are to be found in the exceptionally high prices ruling in 1872 and 1874, which stimulated the working, and increased the production of mines at that time in operation, and led to the discovery, opening, and developing of many new mines throughout this State.

The aggregate production of the quicksilver-mines in California for 1875 is estimated at 53,000 flasks, against 34,000 flasks for 1874. The increased number of sellers, and consequent active competition, favored and accelerated the fall in price, which it is to be hoped has now touched the lowest point. Many of the new mines have discontinued operations, finding no profit in prevailing prices, and it is believed that the small producers, taught by the experience of the past year, will be less eager to force the sale of an article that does not deteriorate with age, and for which a demand at paying rates is certain to arise. While prices were falling, it was impossible to make sales, except in small lots; thus our share of sales for the first quarter of the year were only 1,191 flasks, or 569 flasks less than the number carried over from 1874, and therefore the product of 1875 only found a market when prices were low. For the last quarter of the year the company's share of the sales reported was 4,654 flasks, and on the 31st December the total quantity of quicksilver held by Mr. Bell, at home and abroad, for joint account, was 2,907 flasks, against 2,816 flasks at the same time last year. During the past year the exports to China were 18,190 flasks, against 1,200 for 1874, and were 62½ per cent. of the total exports reported by sea. As quicksilver is used by the Chinese almost exclusively for the manufacture of vermilion, of which their make commands the highest price and largest sale throughout the world, on account of its superior quality and rich and durable color, it may be that the selection of an intelligent chemist for a thorough and exhaustive study of their method of manufacturing it would enable the company to establish improved works for the making of vermilion at the hacienda, employing Chinese labor. The duty on quicksilver having been removed, and that of 25 per cent. left on vermilion, the question of thus converting a portion of the quicksilver product is worthy of attention at the present time.

It appears from the official reports of the Idria quicksilver-mine, in Krain, Austria, that for the years 1870, 1871, and 1872 there was an average annual manufacture at that mine of 56 tons of quicksilver, or 1,464 flasks of 76½ pounds each, and 5½ tons of sulphur into 56½ tons of vermilion, which, in comparison with the year 1869, was an average decrease in the annual production of 31 tons of vermilion. The cause for this decreased production is said to lie in the steady rise in the price of quicksilver during the three years named above. As quicksilver has rapidly declined in price during the past year, it is very probable that their production of vermilion will be increased, they evidently finding it more profitable when prices are low to market their quicksilver in the form of vermilion.

The ores produced at the New Almaden mines in 1875 were 116,048 cargas,* equal to 17,407½ tons of cleaned ore of all qualities.

Of this quantity there were produced :

	Cargas.
Ores from the Old Mine	13, 237
Ores from the San Francisco	6, 384½
Ores from the Cora Blanca	6, 262
Ores from the Enriqueta, &c.	534½
Tierras from the mines	67, 761
Tierras from the dumps	7, 919
Terrero from the dumps	13, 950

Total..... 116, 048

The cleaned mine ore and mine tierras are estimated to be about one-fifth of the total quantity of stuff brought to the surface; therefore, the expenses attending their production include the extraction and removal of a much larger quantity of waste vein-matter, which has to be examined and passed over the planillas or cleaning-floors, and the rock

*A carga is a Mexican load of cleaned ore, ready for the furnaces, weighing 300 pounds avoirdupois.

mined in the dead-work of sinking shafts, running drifts, &c., is also all brought to the surface, the ground in all cases, where it is required, being well timbered and carefully looked after.

The following statement gives the expenditures for labor, as shown by mine pay-rolls, for the year 1875:

Miners for ore by the carga	\$137,587 61
Cleaning ore by the carga	13,811 69
Terrero ore by the carga	18,335 01
Tierras ore by the carga	11,284 90
Transportation by wagons by the carga	4,149 89
Yardage by contract and rock-drills	75,872 00
Timbermen and miners by the day	15,736 24
Tramming	27,322 31
Skilled labor and laborers	16,125 56
Foremen	4,352 00
Total	324,577 21

Compared with the preceding year, these pay-rolls exhibit a decrease of \$4,435.26; the amount for yardage, as in previous years, includes powder, fuse, and candles furnished by contractors and paid for as labor. The average cost for mining and cleaning ore was \$5.73 per carga, or \$1.15 per carga less than in 1874, and the cost of terrero and tierras, as compared with the same year, shows a decrease respectively of 20 cents and 7 cents per carga.

The number of men engaged in the work of the mines during 1875 were equal to an average daily force of 457, and an average of 75 were employed at the Hacienda, making a total of 532 men. Of the number at the mines, 50 were Chinamen, of whom but few were employed at the Hacienda, as white labor could be used to better advantage on furnace-work, &c.

The outside mines, other than the San Francisco and Cora Blanca, gave but little ore, 534½ cargass being their product. Work was discontinued at the Enriqueta mine at the end of March, the price of quicksilver not encouraging further prospecting at a point so remote from our general work.

For the Hacienda (reduction-works) pay-rolls the expenditures were \$57,181.23, as follows:

General	\$33,609 33
Adobes	3,991 21
Furnaces	15,821 94
Railroad	3,758 75
Total	57,181 23

The general expenses named above embrace a large amount of work done for account of the mines, and the railroad charges are for the transportation of ore, tierras, &c., from the mines.

Six furnaces were in operation from January to March, when the continuous furnace was put in use, making seven furnaces running for the remainder of the year, excepting stops for repairs and alterations.

The furnace-returns for 1875 give the following result:

Number of furnaces in operation	7
Number of charges* made	301
Number of tons mine-ore roasted	3,918.400
Number of tons terrero-ore roasted	2,199.480

* For the purpose of making comparison with furnace-charges of former years, the quantity of ore treated in the continuous furnace is reckoned in this number as equal to 36 average charges of No. 6.

Number of tons tierras-ore roasted.....	9,435 ³⁰⁰ / ₁₀₀
Number of tons total ore roasted.....	15,553 ³⁰⁰ / ₁₀₀
Cost of fuel * per ton roasted.....	\$1.71 ⁴⁰ / ₁₀₀
Cost of labor per ton roasted.....	\$1.01 ⁷⁰ / ₁₀₀
Cost of labor and fuel per ton roasted.....	\$2.73 ⁷⁰ / ₁₀₀
Number of flasks of quicksilver produced from mine-ore.....	9,924
Number of flasks of quicksilver produced from terrero-ore.....	1,150
Number of flasks of quicksilver produced from tierras-ore.....	2,467
Number of flasks of quicksilver produced, total.....	13,541
Average yield of quicksilver per ton of mine-ore—9.638 per cent.....	193 ⁷⁰ / ₁₀₀ pounds.
Average yield of quicksilver per ton of terrero—2 per cent.....	40 pounds.
Average yield of quicksilver per ton of tierras—1 per cent.....	20 pounds.
Average yield of quicksilver per ton of all—3.33 per cent.....	66 ⁴⁰ / ₁₀₀ pounds.
Average yield of quicksilver per ton for mine-ore and terrero—6.92 per cent.....	138 ⁴⁰ / ₁₀₀ pounds.

Compared with 1874, the above results show an increase in—

Quantity of mine-ore roasted.....	1,012 ⁴⁸⁸ / ₁₀₀ tons.
Quantity of tierras-ore roasted.....	3,355 ³⁰⁰ / ₁₀₀ tons.
Total.....	4,367 ⁴⁸⁸ / ₁₀₀ tons.
Less decrease of terrero roasted.....	541 ⁴⁸⁸ / ₁₀₀ tons.
Total increase.....	3,826 ³⁰⁰ / ₁₀₀ tons.

The furnace percentage for all ores worked, 3.33, was a gain of $\frac{1}{100}$ per cent., and the mine-ore and terrero together exhibit a gain of 2.63 per cent. over 1874. The increase in percentage and amount of ore worked is largely due to the successful operation of the continuous furnace, No. 7,† of which the record, as well as the quantity of ore produced and roasted monthly, with percentages, &c., is shown in tables Nos. 5, 6, and 7 annexed to this report, to which reference is made, as also to tables Nos. 2, 8, and 9, which present the comparative cost per ton, &c., in the old and new furnaces for the year's work. Of the total furnace-product—13,541 flasks—the old furnaces, six in number, gave 5,828 flasks, and the new continuous furnace, No. 7, gave 7,713 flasks, the latter running only ten months. The average cost per flask made in No. 7 was 65 cents, and per ton of ore worked it was \$1.69 for furnace labor and fuel. No. 6, the largest and best working furnace of the old style, produced 2,806 flasks, at an average cost for furnace labor and fuel of \$2.94 per flask and \$2.13 per ton of ores worked, while No. 4, a fair representative of the other five furnaces, produced 618 flasks, at an average cost per flask of \$9.18 and \$3.44 per ton of ores. This last-named furnace was employed for the first quarter of the year on mine-ore and terrero, with the required quantity of adobes (tierras) to make the necessary fires in the furnace for the free passage of the flame and fumes; the best results obtained were in January, at a cost of \$3.10 per ton of material treated. No. 6 furnace was engaged on mine-ore with adobes for fires in January and February, at a cost of \$2.05 and \$2.04 per ton of stuff worked. The most favorable returns of the operations of the old-style furnace for the year, compared with the average of No. 7, gives an advantage for the latter of \$1.41 per ton over No. 4, 36 cents per ton over No. 6, in addition to a better percentage return.

The erection of a second iron-clad furnace of the same class and capacity of No. 7 has been commenced, and it will be completed in March next. With the two continuous furnaces 19 tons of mine-ore can be properly treated per day of 24 hours, and as the cost for labor for the double quantity roasted will be increased only 50 per cent., the average cost per ton worked will then be \$1.44, or 25 cents less than the present cost. A trial-furnace for continuous treatment of tierras as they come from the screens, without working into adobes or stamping, has been completed and put in successful operation, roasting 10 tons per day, or 300 tons per month, while not more than 120 tons of adobes could be roasted in the furnace monthly previous to the change made by which No. 5 furnace was altered into the trial-furnace. A large double furnace on the same principle, with a capacity of 30 tons daily, is now under way, and the two will give us a long-desired improvement in the handling and roasting of low-grade ores.

The three new furnaces will enable us to treat twice the quantity of ores roasted in 1875, or 30,000 tons; and as it is estimated that the quantity of tierras in the old workings of the mines and on the dumps is about 150,000 tons, there will be no difficulty in keeping all the furnaces running on full time, for which object it will be necessary to make adobes for the five furnaces of the old style.

* To the actual quantity of wood consumed 15 per cent. is added to cover waste, depreciation, &c., and is included in this cost.

† Built after the plan of a furnace erected at the Royal Imperial Quicksilver Mine of Idria, Austria, in 1871, by Herr Adolf Exell, principal mining manager, with modifications and improvements suggested by the experiences of New Almaden.

10 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Table No. 10 appended to this report shows the cost of tierras, their transportation, making into adobes, and roasting in the old furnaces, to average \$6 per ton, treated. With quicksilver at 60 cents per pound, the profit is equal to the cost. In the new tierras-furnaces it is estimated, based on the working of the trial-furnace, that the cost per ton treated will not exceed \$3.42, including cost of tierras, transportation, fuel, labor, &c.

In addition to the quicksilver produced by the furnaces, 13,541 flasks, the sluicings of old mortar, lutings of condenser-doors, dirt, &c., gave 107 flasks, making a total of 13,648 flasks.

For this the costs were as follows:

Hacienda pay-rolls.....	\$57,181 23	
Mine pay-rolls.....	324,577 21	
		\$381,758 44
Materials and supplies.....		92,715 63
Miscellaneous		31,240 49
		505,714 56

From which is to be deducted:

Increase in quantity of ores on hand at the furnaces.....	\$20,098 60	
Receipts from rentals and miscellaneous.....	25,403 40	
		45,502 00

Net cost..... 460,212 56

or \$33.72 per flask, against \$43.85 for like items in 1874, a decrease of \$10.13 per flask.

The furnace-records show that in the 22½ years, counting from July 1, 1850, to December 31, 1874, but omitting the period from October 30, 1858, to January 31, 1861, 2½ years, when the New Almaden mines were closed through litigation, the production of quicksilver from ores mined on the company's property has been a total of 592,805 flasks; adding the product of 1875, 13,648 flasks, the aggregate is 606,453 flasks of 76½ pounds each, or 46,393,652½ pounds of quicksilver. The details of this furnace-work will be found in table No. 11.

At the commencement of 1876, the mine may be said to enter on a new career of prosperity, so far as the prospectus of an increased production of ore and an improved method of treating it in larger quantities at a lessened expense is considered. The question of price is one of demand and supply that time will regulate, undoubtedly to the advantage and profit of the mines that continue in operation, and maintain their connections with consumers at home and abroad.

From the tables appended to Mr. Randol's report, I select the following:

Fluctuations in price of quicksilver during the year 1875.

Months.	In San Francisco.	In New York.	In London.	Months.	In San Francisco.	In New York.	In London.
	Per pound.	Per pound.	Per flask.		Per pound.	Per pound.	Per flask.
January 1.....	\$1 55		£24 00	July 3.....			
January 2.....		\$1 65		July 10.....	\$0 70		
February 1.....			22 00	August 1.....			£10 00
February 5.....		1 55		August 6.....		75	
February 6.....	1 40			September 1.....			11 11
March 1.....	1 30		21 00	September 3.....	65	75	
March 5.....		1 35		September 4.....	70		
March 13.....	1 00			September 10.....	67½		
March 18.....	90			September 17.....	68		
March 19.....			16 00	September 20.....	75		
March 23.....	85			October 1.....			14 10
March 29.....	70			October 2.....		85	
April 1.....			15 00	October 11.....	80		
April 2.....		1 05		October 18.....	85		
April 21.....	68			October 30.....	70		
April 30.....	65			November 1.....	70		12 00
May 1.....			14 15	November 5.....		77½	
May 7.....		85		November 13.....	65		
May 14.....			12 00	December 1.....	70		13 00
June 5.....		80		December 2.....	65	70	
June 28.....	70			December 22.....	65		
July 1.....			11 00	December 31.....	62½	75	11 00

Table showing wages per diem to miners, mechanics, laborers, &c., in various parts of Nevada and California, December, 1875.

	No. of hours worked.	Carpenters.	Masons.	Blacksmiths.	Engineers.	Hard-rock miners.	Gravel-miners and pipemen.	Timbermen and pumpmen.	Tramwaymen.	Laborers.	Foremen in mine.
Spring Valley Water Company, San Francisco.	10	\$4 00	\$5 00	\$3 50	\$3 50					\$3 00	.....
North Bloomfield Gravel-Mining Company, Nevada County, Cal.	8 10 12	4 00 4 00 4 00		4 00		\$3 00	\$3 00 to 3 50 3 75			3 00	\$5 00
Idaho Gold-Quartz Mine, Nevada County, Cal.	8 10 12	4 00 4 00 4 00		3 50 to 4 50	3 50 to 4 00	3 00		\$3 50	\$3 00	2 75 to 3 00	.....
Sierra Buttes Gold-Quartz Mine, Eureka Plumas Gold-Quartz Mine, Plumas County, Cal.	8 10 12	3 45 to 4 95 3 75 to 5 41 6 00		4 45	4 45	2 75 3 35 to 2 75 3 00		3 12 3 43	2 15 2 15	1 80 to 1 95 1 80 to 2 15	5 45 5 95
Chollar Potosi Silver-Mine, Virginia, Nev.	8			5 00 to 6 00	5 00	4 00		5 00	4 50	3 50	9 60
(Other mines at Gold Hill and Virginia City pay the same rates as those given for the Chollar Potosi, and there has been no considerable change made in the rate of wages at above localities during the past two years.)											
Risdon Iron and Locomotive Works, San Francisco, Cal.	10			3 50 to 4 00	3 35 to 5 00					2 00 to 2 50	.....
Guadalupe Mine, Santa Clara County, Cal.	10	3 50 to 4 00	3 00 to 6 00	3 50	3 50 to 4 00	3 00			2 50	2 00	.....
New Almaden Mine, Santa Clara County, Cal.	10	3 00 to 4 00	4 00 to 5 00	3 30 to 4 00	3 00				3 00 to 3 50	2 30	.....
New Almaden Mine, Santa Clara County, Cal.	12									12 50	6 00

New Almaden Mine, Santa Clara County, Cal., August, 1874, 367 miners on contract and tribute, average earnings per day of ten hours. \$2 11
 New Almaden Mine, Santa Clara County, Cal., December, 1874, 289 miners on contract and tribute, average earnings per day of ten hours. 2 84
 New Almaden Mine, Santa Clara County, Cal., August, 1875, 324 miners on contract and tribute, average earnings per day of ten hours. 1 95
 New Almaden Mine, Santa Clara County, Cal., December, 1875, 333 miners on contract and tribute, average earnings per day of ten hours. 1 63
 * Clerks.
 † Furnace-hands.

12 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the progress and expenditures made in the Hacienda tunnel, New Almaden, during the year 1875.

Month.	Paid for—		Total time and materials.	No. of feet driven.	Cost per foot.		Total cost per foot.
	Time.	Materials.			Labor.	Materials.	
January.....	\$1,434 85	\$1,038 16	\$2,473 01	103	\$13 28	\$9 61	\$22 89
February.....	1,418 56	1,829 56	3,248 12	124	11 44	14 67	26 11
March.....	1,404 93	1,414 59	2,819 52	131	10 72	11 03	21 75
April.....	1,278 24	1,648 70	2,926 94	135½	9 44	12 16	21 60
May.....	966 35	1,266 12	2,232 47	94	10 28	13 17	23 45
June.....	1,075 59	1,238 11	2,313 70	83½	12 58	14 48	27 06
July.....	1,335 00	1,492 35	2,737 35	103	12 96	13 61	26 57
August.....	1,381 00	1,084 84	2,465 84	121½	11 36	9 01	20 37
September.....	1,281 37	1,185 75	2,467 12	112½	11 21	10 63	21 84
October.....	797 50	796 36	1,593 86	63½	12 17	12 16	24 33
Total cost with machine-drills	12,353 39	12,954 54	25,307 93	1,090½	11 43	11 99	23 42
HAND-LABOR.							
October.....	540 01	126 56	666 57	96	20 77	4 87	25 64
November.....	1,447 63	188 23	1,635 86	68½	20 98	2 75	23 73
December.....	1,441 75	411 01	1,852 76	80½	17 91	5 10	23 01
Total cost with hand-labor	3,419 39	725 80	4,145 19	175	19 54	4 14	23 68
Grand total	15,772 78	13,680 34	29,453 12	1,255½	12 56	10 90	23 46

Labor includes two engineers, running compressors, four drillmen, four assistants, four trammers, time of blacksmith, machinist, and carpenters for drills, and twelve miners and two trammers on hand-labor, with time of timbermen and blacksmith.

Materials include fuel, oil, lights, rails, air-pipe, steel, explosives, exploders, timber, &c.

Statement of the number of cargoes and tons of ore of all qualities reduced and flasks of quicksilver produced at New Almaden Mine in 1875.

Months.	Ore, cargae.	Torrero, cargae.	Tierras, cargae.	Total, cargae.	Total.		Furnaces, number of flasks.	Sluicings, number of flasks.	Total, flasks.
					Tons.	Pounds.			
January.....	1,770	1,893½	4,100	7,763½	1,164	1,000	836	14	850
February.....	1,966½	1,486½	4,633	8,086½	1,212	1,900	795	5	800
March.....	2,499½	1,750	3,846	8,095½	1,214	600	1,033	.....	1,033
April.....	1,514½	805½	6,596	8,916	1,337	800	810	40	850
May.....	1,984	526½	6,627	9,137½	1,370	1,300	1,088	7	1,095
June.....	1,920	1,033½	5,447	8,450½	1,267	1,100	1,050	.....	1,050
July.....	2,812	1,016½	5,530	9,408½	1,411	600	1,213	7	1,220
August.....	2,160	1,250	5,973	9,383	1,407	900	1,100	.....	1,100
September.....	2,010	1,150	5,507	8,697	1,340	1,100	1,192	8	1,200
October.....	1,984	900	5,297½	8,181½	1,227	500	1,250	.....	1,250
November.....	2,886½	1,250	4,620	8,756½	1,313	1,000	1,674	26	1,700
December.....	2,584	1,553½	4,674	8,811½	1,321	1,400	1,500	.....	1,500
Totals.....	28,121½	14,665½	62,900½	103,687½	15,533	200	13,541	187	13,648

NOTE.—Percentage of all reduced, including sluicings, was 3.35.

The following table, compiled from three given by Mr. Randol, exhibits the comparative efficiency and economy of these furnaces. Of these, No. 6 is provided with Fiedler condensers and a Root blower, as described below, and No. 7 is the new continuous furnace, to which reference is also made below. It should be remembered that No. 7 was running but ten months, having started in March. Its superiority is apparent.

Comparative statement of the class and quantity of ores burned in furnaces Nos. 4, 6, and 7 during the year 1875, with the percentages and number of flasks produced, the cost of labor and fuel, also the cost per flask produced and per ton of ore worked.

Furnaces.	Class and quantity of ore.				Yield of quicksilver.		
	Granza, pounds.	Terrero, pounds.	Tierras, pounds.	Total, in pounds.	Per cent. of all.	Per cent. of granza and terrero.	Number of flasks.
No. 4.....	38,000	285,000	2,971,000	3,294,000	1.43	5.44	618
No. 6.....	1,781,000	2,939,000	3,691,000	7,771,000	2.76	4.36	2,896
No. 7.....	5,671,400	121,600	.....	5,993,000	9.85	9.85	7,713

Furnaces.	Cost of labor.	Cost of wood.	Cost of coke and charcoal.	Cost of all fuel.	Total of fuel and labor.	Cost per flask.	Cost per ton of ore.
No. 4.....	\$2,220 00	\$3,240 00	\$216 00	\$3,456 00	\$5,676 00	\$9 18	\$3 44
No. 6.....	3,127 50	4,744 00	391 50	5,135 50	2,263 00	2 94	2 13
No. 7.....	3,030 00	1,365 75	670 50	2,036 30	5,066 30	65	1 69

NOTE.—Tierras estimated at 1 per cent.

The following is a statement in detail of the working of the new "iron-clad" furnace, No. 7:

Months.	Pounds of ore roasted.	Flasks produced.			Percentage.	Cords wood burned.	Charcoal and coke burned, pounds.
		Free.	Scot.	Total.			
March.....	501,800	449	21	470	7.17	194	5,886
April.....	576,000	503	23	526	6.98	204	8,640
May.....	585,200	738	29	767	6.85	22	8,928
June.....	576,000	713	31	744	9.88	204	8,640
July.....	793,600	810	52	862	8.31	244	11,904
August.....	608,000	658	41	699	8.78	224	9,120
September.....	576,000	744	23	767	10.18	224	8,640
October.....	585,200	862	29	891	11.45	25	8,928
November.....	576,000	1,066	46	1,112	14.76	244	8,640

Statement of the cost of tierras, their transportation, making into adobes and roasting, with estimate of profit per ton.

Furnaces.	Number of adobes per charge.	Number of pounds.	Wood—cords per charge.	Wood—cost per charge.	Labor—cost per charge.	Wear and tear, per charge.
Furnace No. 1.....	5,500	68,000	12	\$78 00	\$40 00	\$10 00
Furnace No. 2.....	5,250	111,000	14	91 00	50 00	10 00
Furnace No. 3.....	700	68,400	12	78 00	40 00	10 00
Furnace No. 4.....	5,500	68,000	11	71 50	40 00	10 00
Furnace No. 5.....	5,000	60,000	12	78 00	40 00	10 00
Furnace No. 6.....	13,500	162,000	18	117 00	55 00	10 00
Totals.....	44,450	533,400	79	513 50	265 00	60 00

14 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

44,450 adobes, 12 pounds each = 533,400 pounds, or $266\frac{1400}{1000}$ tons, of tierras.

Tierras, cost at mine	\$1.53½ per ton, or	\$9.20 per 1,000 adobes..	\$408 94
Tierras, transportation	36½ per ton, or	2 18 per 1,000 adobes..	96 90
Adobes, making	50 per ton, or	3 00 per 1,000 adobes..	133 35
Adobes, handling	45 per ton, or	2 70 per 1,000 adobes..	120 01
Wood consumed, cost	1 93 per ton, or	11 55 per 1,000 adobes..	513 50
Labor, charging, firing, and discharging	1 00 per ton, or	5 96 per 1,000 adobes..	265 00
Furnace, wear and tear	22½ per ton, or	1 35 per 1,000 adobes..	60 00

Total cost of $266\frac{1400}{1000}$ tons 6 00 per ton, or 35 94 per 1,000 adobes.. 1,507 70

Calculating the yield of quicksilver at 1 per cent., the product will be 5,334 pounds, at 60 cts. \$3,200 40

Leaving net margin profit for 6 charges 1,602 70

Or for 24 charges, one month's work, 6 furnaces 6,410 80

At ½ per cent., the profit per month would be 4,808 10

At ¼ per cent., the profit per month would be 3,205 40

Value of quicksilver produced, 1 per cent., is \$12 per ton of tierras-ore worked.

Cost of quicksilver produced, 1 per cent., is \$6 per ton of tierras-ore worked.

Profit of quicksilver, at 40 cents per pound, \$6 per ton of tierras-ore worked.

Statement of production of quicksilver at New Almaden, for twenty-three years and three months.

Dates.	Class and quantity of ore.			Flasks from furnaces.	Flasks from sluicings.	Total flasks.	Average amount per month, flasks.	Percentage, including all.	Percentage of tierras.	True percentage of ore, excluding tierras and sludges.	Number of months.
	Grueso, pounds.	Granza, pounds.	Tierras, pounds.	Total, pounds.							
From July, 1850 to June, 1851				4,970,717	23,875	23,875	1,080 1/2	36.74	.....	36.74	19
From July, 1851 to June, 1852				4,643,980	10,921	10,921	1,080 1/2	38.59	.....	38.59	19
From July, 1852 to June, 1853				4,830,520	18,035	18,035	1,560	39.50	.....	39.50	19
From July, 1853 to June, 1854				7,448,000	26,325	26,325	2,183 1/2	37.03	.....	37.03	19
From July, 1854 to June, 1855				9,108,300	31,860	31,860	2,655	36.75	.....	36.75	19
From July, 1855 to June, 1856				10,353,260	38,083	38,083	3,169 1/2	30.74	.....	30.74	19
From July, 1856 to June, 1857				10,268,900	26,002	26,002	2,167 1/2	19.31	.....	19.31	19
From July, 1857 to June, 1858				10,997,170	29,347	29,347	2,445 1/2	20.41	.....	20.41	19
From July, 1858 to October, 1858				3,873,085	10,586	10,586	864 1/2	20.91	.....	20.91	4
From November, 1858 to January, 1861 ..				13,323,900	39,403	39,403	3,283 1/2	19.96	.....	19.96	19
From February, 1861 to January, 1862 ..				15,981,400	39,392	39,392	3,282 1/2	20.92	.....	20.92	12
From February, 1862 to January, 1863 ..				7,178,660	17,316	17,316	1,442 1/2	20.86	.....	20.86	7
From February, 1863 to August, 1863 ..				2,346,000	4,620	4,620	385	18.00	.....	18.00	6
From September, 1863 to October, 1863 ..				2,346,000	4,040	4,040	336 1/2	17.65	.....	17.65	2
From November, 1863 to December, 1863 ..	54,800	1,586,500	719,000	23,297,900	49,176	49,176	4,093 1/2	13.96	.....	13.96	12
From January, 1864 to December, 1864 ..	1,250,400	18,730,300	3,910,500	23,977,900	47,078	47,078	3,923 1/2	11.30	.....	11.30	12
From January, 1865 to December, 1865 ..	9,928,900	25,749,000	5,440,200	36,855,300	73,990	73,990	6,165 1/2	10.00	.....	10.00	12
From January, 1866 to December, 1866 ..	1,505,000	19,838,100	9,603,145	28,855,933	34,796	34,796	2,899 1/2	6.66	.....	6.66	12
From January, 1867 to December, 1867 ..	731,500	15,689,258	8,373,800	24,065,530	25,557	25,557	2,129 1/2	5.07	.....	5.07	12
From January, 1868 to December, 1868 ..	874,208	14,566,650	12,564,729	23,366,000	16,808	16,808	1,400 1/2	4.83	.....	4.83	12
From January, 1869 to December, 1869 ..	150,000	11,942,175	8,535,800	21,097,700	14,423	14,423	1,201 1/2	3.99	.....	3.99	12
From January, 1870 to December, 1870 ..	30,000	12,531,900	8,373,800	21,034,700	18,363	18,363	1,530 1/2	6.44	.....	6.44	12
From January, 1871 to December, 1871 ..	142,000	12,777,000	8,497,600	21,416,600	19,301	19,301	1,608 1/2	6.63	.....	6.63	12
From January, 1872 to December, 1872 ..	.....	8,492,375	8,838,000	17,330,375	11,042	11,042	920 1/2	4.87	.....	4.87	12
From January, 1873 to December, 1873 ..	.....	.....	12,160,070	23,454,000	8,867	8,867	739 1/2	3.35	.....	3.35	12
From January, 1874 to December, 1874 ..	.....	.....	18,870,900	23,541,200	13,541	13,541	1,128 1/2	1.99	.....	1.99	12
From January, 1875 to December, 1875 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12
Totals and averages	8,436,808	179,195,938	114,165,067	406,457,955	587,148	587,148	48,933	11.21	1.99	14.36	279
Product of Enriqueta from 1860 to 1863 ..				10,571		10,571					

Total product of the mines on the company's property

* Closed by injunction.

606,453 flasks of 76 1/2 lbs each, or 46,393,654 1/2 lbs.

During the year 1875 the following principal improvements and alterations were made at the Hacienda:

A new tank, 32 feet long, 10 feet wide, and 9 feet high, was erected 300 feet above the level of the furnace-yard, and connected with a tank of the same dimensions, situated at the same height, built previously for the purpose of supplying with water the compressors of the bottom tunnel, both together containing about 36,000 gallons of water. A 5-inch pipe leads from these tanks toward the furnace-yard, and is connected with branch pipes which supply eight hydrants distributed through the yard, and which promise a complete insurance against any material damage by fire, on the northwest side of the Alamitos Creek.

A round tank 12 feet in diameter was added to the already existing water-works on the northeast side of the creek; 350 feet of carbolized hose is kept in readiness for any emergency, and the many roofs and sheds, all constructed of wood, and scattered over the yard, to which additions are continually being made, are now completely safe compared with former years; as a few small tanks then existing were allowed to decay for want of proper repairs.

The discovery of rich bodies of ore in the "Cora Blanca," which is isolated from the main works and arteries of communication, necessitated the construction of a wagon-road, also the building of a large platform, serving as a discharging-depot, which is situated at a point where the main tramway joins the newly-made road; the ore and tierras are then shoveled into the cars of the main railroad, and distributed in the usual way. A new wagon-road, leading through the farming-lands of the company, was constructed in conjunction with parties living in the mountainous districts of the Uvas and Llagas, who supply this company with redwood timbers, lagging, &c., for the use of the mine. This road shortens the distance between the different points and the Hacienda considerably, and enabled the contractors for timber, lagging, &c., to deliver the same at the usual rate, as the gain in time by the finishing of this road amounts to one trip a week for each team. Without this road all the materials mentioned would have commanded an advanced price, as the sources of supply become more distant and more inaccessible every year.

The destruction by fire of the old adobe-house and outside buildings used as a boarding-house, on the 6th day of August last, made the building of a new boarding-house a great necessity, and as soon as materials could be obtained a new building was begun and opened during November last. Although an additional building, to be used as a dormitory, will have to be erected hereafter, the structure so far finished answers for the immediate wants. A new warehouse for storing adobes was constructed, 120 feet in length and 30 feet wide. The starting of the iron-clad furnace, which nearly absorbs all the mine-ore, left the old-style furnaces for the roasting of adobes and terrero ore. To meet this increased demand a great amount of adobes had to be made during the summer, and the old sheds not proving adequate to store the amount required, this new warehouse was built. The coal-shed, burned partially at the fire of the former hotel, had to be entirely rebuilt.

The flue mentioned as commenced in last year's report, serving as a conductor for the fumes of Nos. 3, 4, and 6 furnaces, and extending 1,000 feet further up the mountain than the original chimneys of these furnaces, was completed early in the year. The expectation of saving thereby all the wood formerly consumed in the draught-fire-chimney has been only partially realized, but the additional time gained for the condensation of the mercurial and other obnoxious vapors, before their exit to the open air, has proved this a wise investment, and encourages the extension of all the other flues leading from the furnaces. The two wooden condensers for No. 5 furnace, mentioned in last year's report as partially finished, were ready for use, as promised, at the end of January, and an additional one of the same dimensions, namely, 12 feet wide, 12 feet long, 20 feet high, with 34 large windows and divided into 4 chambers, was also completed soon thereafter.

Two brick towers, each 7½ feet wide, 12 feet long, and 26 feet high, and two brick condensers, one 27 feet long, 10½ feet wide, and 27 feet high, the other 20 feet long, 20 feet high, and 10 feet wide, were finished for the iron-clad furnace. This furnace, which was started on March 4 last, has proven to fill, not only all the surmises and expectations formed, and which led to its construction, but has surpassed all of these, and stands to-day unrivaled on this continent, and from all accounts has given better results than the original furnace put up at Idria, in Austria. The furnace-reports amply show that this eulogium of its advantages and successes is fully verified.

A large wooden condenser, giving an additional condensing-space of 4,640 cubic feet, was constructed for No. 1 furnace. This condenser is built on the same plan as those erected for No. 5 furnace. They seem to answer fully their purpose, and on account of their cheapness of construction, durability of their material, and great facility of cleaning their walls, and freeing the whole structure from the adhering quicksilver, (so difficult a task in the old brick condensers,) should supersede, wherever convenient or practicable, the brick or iron condensers. The old wooden flues connecting Nos. 1 and 2 furnaces and condensers with the main flue leading up the mountain-side to the chimney, were replaced, on account of debility and rottenness, by new flues, and in

order to give additional condensing-space for these furnaces, a large brick tower was erected on the hill-side, into which the new flues land, and the fumes, before passing into the main flue, have to traverse the same. The gain in quicksilver secured by this additional condensing-space has amply paid for the outlay.

In the report for last year mention was made of a wooden tower erected for Nos. 1 and 2 furnaces with upcast and downcast shaft, the latter supplied with a spray of water. This tower, with water-arrangement, was found to operate badly, and was therefore removed. The brick chimney serving as outlet for No. 5 and the iron-clad furnace was raised from its original height of 30 feet to 62 feet, securing thereby a stronger draught for the "Monitor." Two large shoots were built for the iron-clad furnace, and these, as also all the other ore-shoots, were covered with roofs in order to keep the ores dry during the rainy season. Two new iron condensers, after Fiedler's patent, were purchased this year, and connected with a Root blower, which was driven by a small engine. This apparatus was put up at No. 6 furnace condensers, and intended to withdraw from the furnace, after the firing had ceased, and the complete roasting of the ores secured, any mercurial vapors which should remain in the mass of hot ore, and which would be lost when the furnace is discharged. The time between the closing of firing and the opening of the furnace, would not give time enough for these fumes to pass into the condensers, as the draught diminishes rapidly after the firing has ceased. This experiment has been a success, and proven that any outlay for this object for the other furnaces would not only shortly pay for itself, but show a handsome profit at the end of the year. The foundation for a new iron-clad furnace, to be erected this year, was laid at the end of December. Numerous tests, trials, and experiments were made, with the object to discover some method of constructing a continuous furnace for the burning of the tierras and obviating the great expense of making them into adobes, but all of these but one offered too many objections for their acceptance.

There was only one experiment which promised success, and No. 5 furnace was changed so as to allow a test of its merits to be made. This proved successful enough to warrant the enlargement of the furnace for a trial on a larger scale, and on the 28th of December last the furnace was started once more. The time elapsed between that day and the date of this report has been too short to form a conclusive opinion, but enough has been ascertained to believe that no formidable obstacle will interfere with its complete success, and the erection of a furnace on the same principle is fully warranted.

The large amount of tierras on hand, and the assurance that the mine could furnish as many as 60 tons per day, made the construction of a new additional furnace for the burning of the adobes an imperative necessity. Plans of a double continuous furnace for the purpose were made, and condensers for the same, designated as No. 8, were commenced during the year, but a successful experiment with the tierras in their natural state, as above described, forced the abandonment of this plan, and a new tierras-furnace will take its place, and the condensers already commenced will be finished for the same.

Since August, 1874, no general clean-up of condensers has taken place until December, 1875. At the first clean-up mentioned, and more so in all previous undertakings of the same kind, a great quantity of quicksilver was found in the flues leading from the last condenser to the chimneys situated on the mountains surrounding the furnace-yard. The construction of additional condensers wherever it was necessary, during the last two years, has shown at the last general clean-up, at the end of the year, a most satisfactory result, and has proven that the outlay for these structures was a wise and necessary one, as hardly any quicksilver was found in the different flues, and in their whole aggregate length of 1,463 feet (leaving out joint flue of Nos. 5 and 7, which could not be cleaned, as both furnaces were in operation and are continuous in their action) only six flasks of quicksilver were collected as the result of sixteen months' operations.

Statement of the business of the Quicksilver-Mining Company for 1875.

Dr.			Cr.
To quicksilver and ore on hand per last yearly report, and cost of quicksilver and ore produced and mined in 1875.....	\$733, 083 00	By balance to the credit of income-account, January 1, 1875..	\$1, 318, 013 44
To materials and supplies used in improvements.....	97, 598 80	By sales of quicksilver.....	719, 257 77
To legal expenses.....	3, 023 77	By rents and privileges.....	20, 241 44
To interest on funded debt.....	59, 500 00	By materials and property sold.....	1, 229 73
To taxes.....	4, 892 21	By interest on call-loans, &c.....	15, 944 36
To exchange.....	675 00	By premium on gold sold.....	12, 658 12
To general expenses.....	11, 493 35	By ore on hand.....	179, 410 69
To net allowance in value of assets at the mine, per inventory.....	9, 959 79	By quicksilver on hand.....	34, 380 00
To balance to the credit of income-account, January 1, 1876.....	1, 430, 909 03		
Total.....	2, 301, 135 55	Total.....	2, 301, 135 55

18 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Balance-sheet December 31, 1875.

DR.			CR.
Real estate and mining property.....	\$11,047,875 60	Capital stock, preferred \$4,219,360	
Convertible-bond stock	71,000 00	Capital stock, common 5,708,700	
Houses and lands	148,066 12		\$10,000,000 00
Railroads	75,603 33	Second-mortgage bonds.....	700,000 00
Furnaces	128,558 33	Income-account.....	1,430,909 03
Virginia City property.....	1,500 00		
Furniture, Hacienda, &c.....	4,000 00		
Machinery and tools	55,546 67		
James B. Randol, manager, cash ..	54,457 73		
David Mahany, treasurer, cash and			
loans	206,327 39		
Materials and supplies.....	99,375 68		
Ore-account	179,410 89		
Quicksilver on hand	34,380 00		
Miscellaneous property	8,507 49		
Woodlands	16,000 00		
Total	12,130,909 03	Total	12,130,909 03

The following summary of the quicksilver industry of California is taken from the Commercial Herald of San Francisco:

The quantity of quicksilver produced on the Pacific coast in the year 1875 amounted to about 54,000 flasks. In this estimate is included an allowance of 500 flasks made to cover various small lots of metal ranging from ten to fifty flasks each, run out by parties owning deposits of limited extent or not yet much opened up, and who have mostly been restricted to the use of retorts alone. This is wholly the fruit of California mines. None of the other Pacific States or Territories have yet made any quicksilver, though cinabar in small quantities has been found in some of them. The total production of this metal throughout the world now reaches about 100,000 flasks, of which California is at present turning out fully one-half. In a few years more the yield of this State will be likely to greatly exceed that of all the world besides. This commodity has been to us for more than a quarter of a century an element of large wealth, and in the aspect of its indispensable use and late high price, may almost be ranked as a royal metal. Until about ten years ago the New Almaden mine was the principal, as it had before been almost the exclusive source of quicksilver production in California. In 1850 heavy production began here, 20,000 flasks having been run out that and the following year. In 1855 the quantity reached 31,860 flasks, falling to 10,588 four years after. In 1860 and 1861 the mine produced nothing, having been closed by injunction. In 1862, 34,765 flasks were made; in 1863, 40,391, and in 1865, 47,194, after which the yield gradually declined year by year, until it reached its lowest point, 9,084, in 1874. The ore from this mine yielded at the start as high as 36 per cent. of metal, but afterward declined with slight fluctuations until it fell to 4.87 in 1873 and 2.96 in 1874, all the low-grade ores being included. Of the entire world's production, England takes, on an average, about 45,000 flasks annually. The consumption on this coast absorbs about one-third the product, leaving the balance for export. The quantity used here is increasing rapidly every year, promising to keep pace proportionately with increased production, even should prices remain at present figures.

From 1858 to 1870 the prices of quicksilver here ranged from 40 to 55 cents per pound, averaging about 47 cents. For the next three years the average price was 93 cents; in 1874, \$1.37½, and last year about 80 cents per pound. For some time to come the price will not be likely to go much above 75 to 80 cents, nor will it probably fall below 55 or 60 cents, as the rapidly-increasing demand for mining-purposes will prevent such accumulation as would tend to force prices downward, while the great abundance of the ore and the widely-distributed proprietorship of the mines will defeat combinations for controlling the market. Owing to the extent and richness of the cinabar-deposits on this coast, and the facility with which the ores can be utilized, quicksilver can be made here with fair profit when the price does not fall below 60 cents. Heretofore the markets of the world have been affected by certain speculative influences, rather than by the natural agents of demand and supply. Domestic combinations and foreign monopoly have kept them in a state of tension or relaxation, as best suited their purposes. If small lots of quicksilver were thrown upon the London market, the Rothschilds at once depressed prices until they had secured these lots and checked further outside importations, when rates were again advanced to former figures. Under the enormous production hereafter to be made, this style of controlling either the home or foreign market will hardly be practicable. The exports of quicksilver from 1859 to 1874, inclusive, amounted to 365,430 flasks, and, including exports of 1875, give a total of 394,390 flasks, valued at \$14,289,591. The exports last year were 28,960 flasks, not including several thousand flasks shipped east by rail. The

area of production has recently become so enlarged as to require some detailed notice of the more important cinnabar localities lately discovered.

Beginning at the most northerly point in the State, where extended work is being carried on, we find a number of parties actively engaged opening up the rich deposits that for a long time have been known to exist in Trinity County. During the early days of gold-gathering on the upper waters of the Trinity River, fragments of a crimson-colored rock were found by the miners, intermixed with the gold-dust, its weight being such as to prevent their easy separation. This "red stuff," so called, bothered the honest diggers not a little, interfering with their operations much after the manner of the celebrated "blue stuff"—the rich sulphurets of silver—at a later day vexed and bewildered Comstock and his companions, when working below the great Washoe lode, the tracing up of which led afterward to the discovery of that widely-famed deposit. To this material—the red sulphuret of mercury—little attention was paid for many years, no attempts at utilizing it having been made until 1873, when the high prices of quicksilver induced parties to commence gathering it in the vicinity of the locality now known as Cinnabar, where the surface-soil over a considerable area contained these particles of rich ore, much of which had been carried by the water and lodged along the adjacent ravines. Washing these ravines with rockers afforded the miners good wages for some time, when they finally came upon the veins from which these fragments had escaped, and which were found to be large and well charged with metal. In the early part of 1875 the reported richness of these deposits attracted the notice of certain San Francisco capitalists and miners, and they purchased the largest and most promising claim in the district, and, having organized under the name of the Altoona Quicksilver Company, proceeded to outfit it in first-rate style. This mine is situated about 20 miles from Trinity Centre, and only 18 west from the line of the California and Oregon Railroad. The ore occurs in a regular contact-vein, lying between serpentine and sandstone. It varies from five to twenty feet in width, the matrix being a decomposed sandstone. As the whole of this mass consists of workable ore, carrying from five to twelve per cent. of metal, this may be considered one of the most valuable discoveries of cinnabar yet made in the State. It is a most remarkable fact that the entire mass of material standing between the walls of the lode is here removed and sent to the furnaces, none of it yielding less than four per cent. of metal. The surface of the vein has been uncovered for a distance of 400 feet, showing the ore deposit of uniform dimensions throughout. It has also been opened to a depth of 50 feet by means of tunneling, a second tunnel being now in progress to intersect it at a much greater depth. The drifts and cross-cuttings made show the ore on the lower levels in increased volume and richness, the regularity of the walls and the many stringers coming in pointing to continued fertility and permanence. The ore-body also undergoes a marked expansion with depth attained. In running the lower tunnel several blind lodes have been cut of such power as to raise the question whether the one already opened is the dominating vein of the series, if, indeed, a mineral-belt of extraordinary dimensions does not here cross the face of the mountain, carrying an indefinite number of heavy veins. The ore in these lateral fissures is all of high grade, varying from two to four per cent., some rich streaks going as high as twenty. Coming into possession of this property in July, the owners, running three small retorts, making from three to six flasks per day, have since realized over \$32,000 from the product of their quicksilver, the ore for supplying these retorts having been packed a distance of ten miles on mules. Having constructed a wagon-road to the mines, a furnace has since been erected on the ground, which is now operating with a capacity to run out 300 flasks per month. As additional furnaces will probably be built very soon, there being an abundance of ore, there is no calculating what the yield of this mine may be before another year has passed by. The country here is heavily timbered and abounds in fine streams of water, affording every facility for the cheap operating of the mines. Not far from the Altoona are situated the mines of the Boston Company and several other promising claims, some of which are already outfitted with reduction-works, the most of them being yet of limited capacity, running only from ten to forty flasks per week. On the most of these claims systematic work is being done, and there is little doubt but some of them will prove to be valuable properties, the Boston claim being considered of scarcely less prospective value than the Altoona. It is, in fact, evident that a very important quicksilver-field is about to be opened in the far north, and from which a heavy contribution to the yearly out-put of this metal may hereafter be looked for. The entire yield of Trinity County the past year was about 1,500 flasks, which amount, it is believed, will be six-fold greater next year. Coming south from Trinity, the next quicksilver-producing locality met with is in the Coast Range, Colusa County, where, but a little more than a year ago, much activity prevailed in the way of prospecting, locating, and developing the quite numerous but not very heavy deposits of cinnabar there occurring. In consequence of the decline in the price of this metal that took place early last year, this activity soon abated, only two or three claims continuing afterward to be worked. During the year the Abbott Mine, with one small furnace, turned out about 250 flasks,

the Buckeye made about 50, and the Sulphur Spring 100 flasks, to which the Elgin and some other small claims added perhaps 25 more, making a total production for the year of 425 flasks on account of the mines in this county.

In Napa, Sonoma, and Lake Counties a great cinnabar-region is being opened up, although the prospects, considered so bright a year ago, have here, too, been somewhat obscured by the declining price of quicksilver. The Redington Mine, the largest producer in that section, makes, as it was expected it would do, a good showing for the past year, having taken out, during ten months' actual running, 8,080 flasks of metal, their furnaces having remained inactive for the first two months' of the year to admit of needed alterations and additions. Toward the close of the year the out-turn was at the rate of over 1,000 flasks per month, an increment due to the more effective style of furnace introduced for treating a class of ores difficult of successful reduction by those formerly in use. Six furnaces, capable of handling 120 tons of ore per day, are now run on this mine, the ore-supply for which is taken wholly from the stopes above the 200-foot level. Exploration is, however, kept well in advance of extraction, the reserves here holding a two years' supply of ore. This company were fortunate in having a contract to supply 400 to 500 flasks per month during 1875, with Flood & O'Brien, at current market-rates of quicksilver. Owing to their prosperous financial condition at the beginning of the year, having large accumulations of cash brought over from the preceding year, this company claim to have been able to disburse dividends during 1875 to the amount of \$453,600, besides defraying costs of many important improvements. Next to the Redington on the list of largely-producing mines in this section stands the Sulphur Bank, in Lake County. This company own at that point what promises to be very valuable deposits of cinnabar, the ore being of good grade and easily extracted. The mine has been well opened and outfitted, and will hereafter be able to make a large and profitable production. The metal turned out last year amounted to 5,215 flasks, a quantity that will be materially increased the current year. The yield of the other more actively-producing mines in that section for the past year may be stated as follows: The Great Western, 3,384 flasks; the Manhattan, 437 flasks; the Buckeye, 700 flasks; the Saint John, 2,100 flasks; the Cloverdale, 714 flasks; the Phoenix, 300 flasks; the Great Eastern, 413 flasks; the additional small lots produced in this vicinity having amounted to about 1,000 flasks. The New Almaden Mine made last year 13,648 flasks; the New Idria, 8,800 flasks; the Guadalupe Mine, with but one small furnace, having turned out 3,415 flasks. The other small lots of metal produced elsewhere in the State will probably be covered by an allowance of 500 flasks. In San Luis Obispo County, another new field which this industry has invaded, a number of cinnabar-deposits are being developed and furnished with reduction-works, the most noteworthy of this group consisting of the Oceanic and the Sunderland, the only ones that have as yet been brought into a condition of considerable production. The Sunderland, with a furnace of 15 tons of daily capacity, ran out 1,500 flasks last year, a yield that will probably be doubled the present year. The Oceanic, with three furnaces, disposes of 75 tons of ore per day, turning out 200 flasks per month. This is a big mine and has sufficient ore developed to run the present furnaces profitably for years. The distinguishing feature of this property consists in the great amount of ore contained between the walls of the lode and the facility with which it can be extracted. About 14 feet of ore is here broken down and passed bodily to the furnaces, being so nearly uniform in quality as to admit of little selection. This is probably the cheapest mine to work in the State, the labor-force numbering scarcely more than half the usual average in mines of equal capacity. The product of this mine amounted last year to about 2,000 flasks, a quantity that might easily be, as it most likely soon will be, largely extended through the erection of additional furnaces and an increase of the working-force. There are two or three other mines in this part of the State making more or less quicksilver, their aggregate product reaching, perhaps, two or three hundred flasks per month, or 2,500 flasks for the past year. In at least a dozen other counties, scattered throughout the length and breadth of the State, cinnabar-deposits have been discovered, some of which show good indications for permanence and wealth. A few of these have been partially opened up and outfitted with retorts, and have produced from 10 to 50 flasks of metal each, an allowance of 500 flasks being enough, no doubt, to cover all the quicksilver made during the year by this class of mines.

From Horatio P. Livermore, treasurer of the Redington Company, we have received in manuscript the following report of that mine. It is as follows:

"The Redington Quicksilver Company during January, February, and a portion of March, 1875, were not producing quicksilver, being engaged in adding to and changing their reduction-works. In March they got their reduction-works well under way again, and their reduction for the current year ending December 31, 1875, (say ten operative months,) has been 8,080 flasks quicksilver. Since September 1 their production has been upward of 1,000 flasks per month, at which figure it closes the year. This increase of product is in a great degree due to the marked success of two new furnaces for the reduction of fine ores or tierras. These furnaces are the invention of the su-

perintendent of the company, Charles E. Livermore, and they may safely be said to introduce a new element into quicksilver-reduction, making it possible to profitably utilize material largely produced by all quicksilver-mines, but heretofore handled always at no profit, and frequently at an absolute loss. The Redington Quicksilver Company have now in active, continuous operation four of the Knox & Osborne patent furnaces, and two of the Livermore patent fine-ore furnaces, their total reducing capacity being upward of 120 tons of ore per day. This large quantity of ore is easily yielded by the upper levels of the mine, none having been drawn from below the 200-foot level. The mine has, however, been opened by shaft to the depth of 400 feet, and constant prospecting-work is maintained in advance, so as to insure a supply of ore for at least two years ahead of requirements. The company employs 300 men in its various departments, and has very extended works, the whole affording a most striking example of what careful management on a strictly business basis may accomplish. Such results have been attainable by reason of the fact that the management of the mine has been carefully attended to by the comparatively few individuals who own it; and the property, though incorporated as a stock company, has never been on the stock-market for sale and speculation, but has always been handled as a legitimate operative business. It has during the past year enjoyed a profitable contract with Flood & O'Brien, to supply them with 500 flasks per month, and this contract is still in force. The capital stock of the company is \$1,260,000, in 1,260 shares of \$1,000 each, and regular monthly dividends of \$30 per share have been paid thereon during 1875, or \$37,800 per month, making a total of \$453,600 divided profits for 1875. Besides this, at least \$125,000 has been invested in new land-purchases, buildings, machinery, new reduction-works, and other appliances, adding largely to the value and future productiveness of the property."

We learn from an official source that the total available cash of the Redington Quicksilver Company during 1875, including a surplus brought forward January 1, amounted to \$780,134.28; dividends in 1875, \$453,600; leaving balance \$326,534.28 for running-expenses. This is certainly a very handsome exhibit for the company, when we recall to mind the fact that in January, 1875, prices ruled as high as \$1.50 to \$1.55; February, \$1.30 to \$1.35; March, \$1.15 to 75 cents per pound; April, 70 cents to 65 cents; and these were ruling rates during the balance of the year; closing price, 62½ cents. It should be stated, moreover, in justice to the Redington Company's exhibit, that they claim to have had on hand a year ago a large surplus stock of quicksilver, which they sold at \$1.50 to \$1.30, cleaning all out before the great decline, and leaving them in possession of a monthly contract at a fixed price, and which, we understand, has been extended for another three months with the same parties, contracting with them a year ago; probable price, 70 cents.

The San Francisco Bulletin gives the following as the production :

New Almaden, flasks.....	13, 648	Brought forward.....	46, 642
New Idria, flasks.....	8, 800	Sunderland, flasks.....	1, 500
Redington, flasks.....	8, 080	Cloverdale, flasks.....	714
Sulphur Bank, flasks.....	5, 215	Buckeye, flasks.....	700
Guadaloupe, flasks.....	3, 415	Manhattan, flasks.....	437
Great Western, flasks.....	3, 384	Great Eastern, flasks.....	413
Saint John, flasks.....	2, 100	Phoenix, flasks.....	300
Oceanic, flasks.....	2, 000	Various, flasks.....	3, 000
Carried over.....	46, 642	Total.....	53, 706

PETROLEUM.

I am indebted to Mr. Fred. A. Clarke, late of the Geological Survey, for the following notes on this subject:

Some ten years ago petroleum-springs were discovered in California, since which time there have been found divers deposits, but not in quantity or quality sufficient to make the subject worthy of investigation or experiment, save in the coal-oil districts of Sespe and San Fernando.

Here lies a section of some fifty miles square, over the face of which are prominent evidences of the existence of a large petroleum-deposit.

The *San Fernando petroleum district*, lying in the northwest corner of

Los Angeles County, at its farthest point not more than ten miles from the Southern Pacific Railroad, is located on the foot-hills and northeast slope of the San Gabriel Mountains, having the Santa Clara Valley to the north. The main belt of oil-bearing shale is readily traced from 400 feet to 500 feet wide, for some six miles, trending northwest and southeast, and inclosed in wall-rocks of sandstone. The dip of the shale is southwest at an angle of 32° . On the east flank of the shale, in cañons and on spurs, are numerous small oil-springs.

The *San Buenaventura petroleum district* lies to the west of the San Fernando district and is in San Buenaventura County, distant from the Southern Pacific Railroad some thirty miles, forty miles from Los Angeles, and adjacent to tide-water at the port of San Buenaventura. The district is located about Sespe Creek, in San Gabriel Mountains, and is mountainous in its topography. Santa Clara River runs through the locality. There are here large petroleum-springs, the oil from which is carried down to and out upon the ocean for miles.

It is only of late that developments in these districts have been carried to a successful issue. The crude petroleum is found of 40° gravity. In San Buenaventura district there is a small refinery, producing from the crude petroleum of the supply-wells 59 per cent. of illuminating-oil of 130° fire-test, and of water-white and odorless qualities, said to be up to eastern standard. In the San Fernando district there is a flowing well of forty barrels per day, and a refinery producing from this oil 60 per cent. of illuminating-oil of 120° to 130° fire-test, and of high grade; 25 per cent. fine-grained lubricating-oil, 18° gravity. The remainder is fuel. None of these wells carry paraffine. A large refinery is going up at Newhall, on the Southern Pacific Railroad station on Santa Clara River, and a narrow-gauge railroad from Newhall through the oil-section to the Pacific Ocean, some 50 miles, is in contemplation.

Developments carried on with the advantage of the experience of Pennsylvania give good reason to expect here the successful establishment of a commercial industry of especial benefit to the California market, with the additional attraction of an outlet furnished by the islands of the Pacific and Japan, China, and India.

ALPINE COUNTY.

The most important work in the county has again been done by the Exchequer Company, under the management of Mr. Lewis Chalmers. The perseverance of the company has at last been rewarded by the discovery, at the 300-foot level, of a very large body of exceedingly rich silver-ore, and at the end of the year Mr. Chalmers was preparing to start his mill, after first introducing into it furnaces for chloridizing the ore. The following account of the mine, transmitted to me by Mr. Chalmers, contains all of importance in regard to the enterprise.

The development of the mine was commenced by the old-time method of running a tunnel 800 feet long immediately under the croppings of the ledge, at no point cutting the vein at a greater depth than 125 feet below the surface. With the exception of showing the ledge to be regular in its course, from north to south, with a dip of nearly 45° to the south and east, and to contain spots of rich ore, this work was almost entirely thrown away. An incline winze was then started on the ledge at a distance of 120 feet from the mouth of the tunnel. This winze has been sunk a depth of 300 feet, following the inclination of the ledge the entire distance in ore of good milling quality, and which has

grown richer as the shaft descends. At the depth of 30 feet below the tunnel-level an ore-stope was opened and a considerable amount of ore extracted. Fifty feet lower down another ore-stope has been started, and at the depth of eighty feet a level was opened for working, and the top of a chimney of rich ore struck.

At a depth of 140 feet this chimney of ore was greatly enlarged, and the vein apparently widening and the ore growing so much better that it was resolved to stop work in the tunnel and incline and erect steam hoisting-works and sink a working-shaft at a point 300 feet lower down the mountain-side. This shaft has been sunk to a depth of 300 feet and over. Stations have been opened and drifts run at the 100, 200, and 300 foot levels of the shaft, which places the lowest point at which the ore-vein has been prospected at a depth of 500 feet below the croppings. The ledge continued to look more favorable and the ore to show greater concentration on the 100-foot level. Ore-stopes have been opened at that point on the ledge which descends with the slope of the mountain, and which have proved to be almost entirely rich milling ore to within 40 feet of the surface. On the 200-foot level a drift 6 by 7 feet in size has been run a distance of 400 feet in the ore-vein without touching either wall, the face in rich ore. The ore on this level is very rich, an average assay made by the assayer of the mine showing \$85.11 in gold and \$5,710.83 in silver to the ton. On the 300-foot level of the shaft a drift has penetrated the vein 100 feet, showing the ore to be of even a finer quality than it is on the 200-foot level.

The ore contains base metals in quantities sufficient to require roasting before its reduction in the mill. The body is composed of silica mixed with magnesia, iron, antimony, and sulphur. Much of the ore has so strong a resemblance to actinolite, a greenish species of hornblende, that good judges would be puzzled to discern a difference. On the lower levels the ore is interspersed with quantities of beautiful ruby-silver, of the light-red kind, being a combination of silver, arsenic, and sulphur. Average samples, sent to a friend in Gold Hill, were assayed by Mr. Christopher James, the assayer of the Crown Point and Yellow Jacket Mines, one of the most competent assayers on the coast, and gave the following results: That taken from the 140-foot level of the upper works gave \$241 per ton, all silver; that of the 100-foot level of the new shaft, \$1,019.63, of which \$30.13 was gold and the balance silver. The samples from the 200-foot level of the new shaft gave \$852.49, of which \$20.09 was gold and the remainder silver. The ledge on the lower levels is from 4 to 15 feet in thickness, and is all ore. Both above and below it is separated from the country-rock by heavy clay seams.

The present hoisting-works are entirely too light to prosecute the development of the mine with the required vigor, and the work is confined at present to the sinking of the shaft for opening another level. It is the intention, as soon as spring opens, to commence the erection of new and powerful steam hoisting-works. Three miles from the mine the company have a first-class eight-stamp mill erected. To this are now being added furnaces for roasting the ores and an additional battery of ten stamps, making eighteen in all, which will commence crushing ore from the mine in a very short time. There are now at the mill ready for reduction 700 tons of ore, and, with the present facilities for extracting and the large amount of ore uncovered ready to take out, there will be no trouble whatever in keeping the mill running for at least a year to come.

INYO COUNTY.

Inyo County lies east of the main crest of the Sierra Nevadas, border-

ing on the State of Nevada. The Inyo Mountains, running north and south, traverse the center of the county. The Panamint, a higher range, lies farther to the east. The country has an area of 4,680 square miles, and contains several mining-districts, the most important being Cerro Gordo, Panamint, Kearsarge, and Darwin. The silver-lead mines of Cerro Gordo produce about \$1,000,000 of bullion annually. Panamint and Kearsarge districts contain fissure-veins of silver-bearing ores, and Darwin district (discovered in 1874) large masses of argentiferous galena and carbonates, which have not at this date been sufficiently developed to determine their character. The county contains seven quartz-mills, aggregating one hundred and twenty stamps and ten furnaces. Other furnaces are in process of construction in Darwin district, and a large bullion-production may be anticipated for the year 1876 from the ore-bodies already developed.

This county was visited and described by Mr. C. Luckhardt in 1870, (see Report of 1871, pp. 17-27,) and by Mr. A. Eilers in 1872, (see Report of 1873, pp. 17-21 and 354-357.) Subsequently, in 1874, Mr. C. Stetefeldt visited Panamint and made a report, which will be found in my Report of 1875, p. 33. (See also report of William Crapo, on p. 27 of the same volume.) The developments in Darwin district at that time, although promising, were not sufficiently advanced to render the inspection of a special agent necessary.

I am indebted to Mr. C. Weberling, of the Surprise Valley Mill and Water Company, Panamint district, for the following valuable summary from that locality.

The principal mines worked are the Wyoming and Hemlock, now 450 to 500 feet deep. The ore is taken to the mill by a Hallidie wire tram-way. Average assay-value as delivered to mill, \$80 to \$100 silver per ton. The mill contains twenty stamps, (900 pounds, drop 9 inches, eighty-five to ninety per minute,) crushing (dry) 22 to 25 tons per twenty-four hours; 100-horse-power engine; ten pans, holding 1 ton each of dry pulp, (revolutions fifty-eight per minute;) a Stetefeldt furnace of the newest construction, (capacity 40 tons per twenty-four hours.) The consumption of wood in the furnace is three to three and one-half cords per twenty-four hours. From 2.7 to 3 per cent. of salt and 2 per cent. of iron pyrites are added to the ore before roasting. The average results of four months' running have been: Chlorination, 93 to 94 per cent.; amalgamation, 91 per cent.; fineness of bullion, .964. The ores being highly cupriferous, these favorable results are mainly attributable to the excellent working of the Stetefeldt furnace. The direct costs for reduction have been from \$18 to \$20 per ton, wages being \$4 to \$5.50 per day, and wood \$12 per cord.

Mr. J. Neiswander reports concerning the Sunrise and Twilight Mines, owned by the Sunrise Company:

Length of location, 1,500 feet each; course, east and west; country-rock, limestone; vein-matter, quartz; depth of shaft, 50 feet; two levels, total length, 175 feet; twenty miners, at \$4 per day; cost of mining, \$5 per ton extracted; of milling, \$8; average yield, about \$80 per ton. The company mill (40-horse steam-power) has five stamps, (900 pounds, eighty-five drops of 8 inches per minute;) three pans, and two concentrators; cost, \$35,000; capacity, 10 tons per twenty-four hours.

The latest reports from Panamint district indicate a danger of exhaustion of the ore bodies, though the veins seem to continue in depth. Some miners assert that the argentiferous gray copper ores, which here predominate, are always treacherous in this way. If this be a fact, it

is only of local application—say in a certain belt of country; and I cannot see, even in that case, why the blame should be laid on the mineral, rather than on the general formation, which may have resulted in detached bodies rather than continuous seams of ore.

The economy of silver-lead mining in Darwin district will be fully understood upon perusal of the able and comprehensive report of Mr. L. L. Robinson, president of the New Coso Mining Company, dated December 15, 1875, from which I make the following extracts:

Mr. Robinson says: Our deepest working (on Lucky Jim Mine) is 137 feet, on Christmas-Gift Mine, 95 feet. At these depths the two mines show great strength and richness, and at all other openings they also show the same peculiarities, and give every evidence of permanence in depth. At the Christmas-Gift Mine there are five shafts, varying in depth from 35 to 95 feet.

The opening up of such an extent of ground as we have been working on is necessarily slow, and as no reliance could be placed upon any one shaft or opening, there have been five shafts sunk on one mine and four on the other mine, the Lucky Jim. From these shafts drifts have been run on the veins and cross-cuts have been driven to prospect the ground, until we have sunk in all 625 feet of shaft, and run 620 feet of drifts and cross-cuts, besides work on surface in open cuts and tunnels to an extent of 150 feet more in length.

Near the surface the mines turned out considerable heavy lead-ores, which were taken to the furnace and smelted. As the workings attained depth the nature of the ores kept changing, and although they were always rich in silver, yet what are called "dry ores" became predominant, and for a time it looked as if the mines would turn entirely to milling-ores. Deeper workings and more extensive openings have, however, again developed large bodies of heavy ores, and although large amounts of dry ores were also developed, yet these are left standing in the mines for future workings and attention is turned to following the heavy ores which answer for smelting. With our heavy ore we now mix at furnace a percentage of dry ore, and so consume constantly quite an amount of ores of this class.

In a section of country where everything is so expensive, and where it is not advisable to take any risks that can be avoided, and where open surface-excavations are not objectionable, it is good policy to follow the veins, and particularly is this the case where the heavy lead-ores are encountered, as such deposits are generally apt to be eccentric. Finding, as we do, so large an amount of dry ores in our mines at present depth, and not knowing what developments may take place in greater depths, I deemed it my duty to examine the country pretty thoroughly, in order to ascertain where facilities, if any, could be found for a mill-site. The result of these examinations develops excellent locations some three or four miles from the mines, where water can, it is believed, be had in sufficient quantities. The location is easy of access from the mines, and a road with a descending grade the entire distance, some three or four miles long, can be cheaply constructed over hard ground for almost the entire distance.

In the future operations of the company, should it be deemed best to erect a mill, it will also probably be advisable to move our furnaces to the same location. Should such a course hereafter become necessary, our supply of coal and wood can be delivered at such location as cheaply from Owens Lake as it is now delivered at the present furnace from Coso Mountains.

Iron-ores are expensive to procure, and by the time they are delivered at the furnace for use cost us not far from \$20 per ton. Our want of iron-ore stimulated prospectors, and during my stay I personally examined two other deposits, one of them on top of Coso Mountain, some fourteen miles from furnace; the other between Darwin and Owens Lake, about eight miles from Darwin, and gave discoverers a contract to take out of each mine and deliver fifty tons of the ore at a point where our teams can reach it. The price agreed to be paid is \$5 per ton from one mine and \$6 per ton from the other. These ores will cost us less than \$15 per ton, and they are of excellent quality. My examination of these so-called mines led me to the conclusion that they could not be relied upon in depth; they, like all the other iron-deposits which I had seen there, are iron caps.

There is no doubt but we can in time find all the iron-ore we may require. Its cost to us may necessitate, however, the erection of reverberatory furnaces, in which to roast the heavy galena-ores before smelting, and so do away with the necessity of consuming so much iron-ore.

Fire-clay and alate have both been discovered, and samples taken. It takes one of our ten-mule teams five days to make a trip for clay or alate, bringing 8,000 or 10,000 pounds, making its cost to us \$17.50 to \$20 per ton. The limestone which we have also been using for flux has changed, carrying more quartz.

Preliminary work costs us largely, not only in direct expense but in increased cost

26 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

of working our furnaces, consequent upon frequent stoppage. These stoppages are caused by changes in our ores and fluxes, which have been constantly varying.

Water can be found in sufficient quantity to supply all the furnaces at Darwin within five or six miles of their location. As the three furnaces will pay, running steadily, at least \$40,000 a year for water, they can afford to expend money liberally in cheapening this cost. My belief is that water can be had which shall cost, including large interest on the outlay, less than one-half of this amount yearly.

We canvassed the economy and necessity of erecting a litharge furnace in connection with our present works. With such a furnace we could reduce our bullion in bulk and weight, but increase it largely in value per ton, making it some 200 fine in silver instead of 7 fine as now, and using the litharge in smelting our dry ores as well as flux. To erect such works will cost at least \$2,000, or possibly \$2,500.

Windlass-men constitute a large portion of "mine-labor account," as it takes four men per day at each windlass, costing \$16 per day for hoisting at each shaft. Taking the Main shaft and Yellow shaft at Christmas-Gift Mine, as also the Cactus, or No. 2 shaft, on the same mine, where we are hoisting from drifts, and the New shaft and Footwall shaft at Lucky Jim, requires an expenditure of \$50 per day, or nearly \$2,500 per month, which is over one-third our labor-account at mines. There is no way to decrease this large expense until we decide upon our main working-shafts and erect horse-whims.

The ore-sorters constitute quite a large force, but they are absolutely necessary, as it is not economy to transport valueless material to furnace, and it is certainly most expensive to put such material in the furnace. To avoid this last danger we keep one ore-sorter at the furnace. I found at times eight or ten men at work sorting ores, costing \$32 to \$40 per day, or say \$1,000 to \$1,200 per month.

Our pay-roll at mines varies from \$6,000 to \$7,000 per month.

At the furnace, the regular force consists of—

1 day-foreman, at \$6 per day; 1 night-foreman and chief smelter, \$200 per month—per day	\$13 00
2 engineers, day and night, \$5 and \$4.50	9 50
3 smelters, eight-hour shifts, day and night	\$5 00 15 00
3 helpers	4 50 13 50
3 chargers	5 00 15 00
2 coal-passers, 12-hour shifts	4 00 8 00
2 slag-men	4 00 8 00
1 ore-sorter, day-man	4 00 4 00
2 rock-men at crusher, day and night	4 00 8 00
1 general workman and blacksmith, day	4 00 4 00
1 brick-maker	4 00 4 00
1 furnace builder and repairer	4 00 4 00
23 in number, costing per day	106 00

The official staff consists of a superintendent, with a salary of \$5,000 per year; assayer, at \$300 per month, and book-keeper, at \$150 per month.

I made an approximate estimate of cost of everything on hand, as also cost of our works to December 1, 1875, with following results:

Mining-timbers, wood and lumber on hand	\$3,500
Coal, estimated	19,500
Supplies of various kinds	1,000
Mules, wagons, horses, harness, &c	10,000
Cost of headquarters, offices, assay-office, with cost of lot, \$165	1,500
Corral lot, fence, building, &c	1,500
Boarding-house at mine	1,000
Water-tanks, &c	750
Ore-platform, shoots at mines	1,250
Hay, grain, &c	500
Cost of furnaces and appurtenances	45,000
Ores on hand at furnace, cost, say	2,000
Bullion on hand at furnace	350 bars
Shipped	650 bars

Total bars

1,000, value..	15,000
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Cost of everything as above, approximate	102,500
Add cost of 650 feet shafting, \$25, estimated	16,250
Add cost of 650 feet drifts, \$15, estimated	9,750
Add cost of 150 feet tunnels, \$10, estimated	1,500
Add cost of timbers, ladders, &c	2,500

Add cost of wagon-road.....	\$3,000
Add cost of Cuervo spring.....	1,500
Add cost of interest in Tiger Mine.....	217
Add cost of interest in iron-mine.....	600
Add cost of sundry expenses.....	2,183

Total expenditure..... 140,000

Not including cost of running furnace and expenses connected with same, nor transportation-account, nor general expenses.

Our expenses at Darwin for November were approximately as follows:

Mine pay-roll.....	\$6,000
Furnace pay-roll.....	1,800
Iron-mine pay-roll.....	300
Stables pay-roll.....	300
Buildings.....	150
Salaries.....	850
Mine-supplies.....	1,000
Furnace, (coal, wood, &c.).....	3,000
Iron-mine.....	300
Stable and team expenses.....	800
Contingent expenses, estimated.....	300
Estimated for water, &c.....	1,200

Total for November..... 16,000

The assay-book shows from October 15 the assay-value of the ores from all parts of the company's mines at different intervals. Previous to that date a large number of assays were made, but no record was kept of them. Now a complete record is kept, and analyses are being made continually of our ores and fluxes in order to know what fluxes and proportions of ores and fluxes to use in the furnace, but no record is kept of these.

The exhibit certainly shows great richness in our ores, and when it is taken into consideration that we have produced over 6,000 bars of bullion, worth some \$100,000, out of our shafts and drifts alone, without stoping, and all this within less than 100 feet from the surface, it certainly speaks well for the richness of our mines. They appear to gain in strength and richness as we get deeper upon them.

The result of the last analyses, made with reference to establishing proportions to use in furnace, gave the following:

FURNACE-CHARGES, DECEMBER 2, 1875.

	Pounds.
7 shovelfuls of ore, average 19 pounds.....	133
$\frac{1}{2}$ shovelful of iron-ore, average 19 pounds.....	10
Charcoal.....	35
$\frac{1}{2}$ shovelfuls of slag, $15\frac{1}{2}$ pounds.....	31
$1\frac{1}{2}$ shovelfuls of lime, 13 pounds.....	20

Total weight of charge..... 229

Of this total weight for charge 194 pounds is ore and fluxes.

Running steadily, about 300 charges per day are required. This would require 20 tons of ore, $1\frac{1}{2}$ tons of iron, $4\frac{1}{2}$ tons of slag, 3 tons of lime, $5\frac{1}{2}$ tons of coal—giving 34 $\frac{1}{2}$ tons, gross weight. This should turn out of our ores, if furnace runs without interruption, 150 to 175 bars bullion per day, weighing 12,000 to 14,000 pounds, or six to seven tons, worth nearly \$2,000 in silver alone.

The above proportions of course are varying constantly, as is the yield, as our ores vary in richness in silver and lead. The above charges and results are with ores carrying not less than 40 per cent. in lead.

Quite a percentage of our ore is carried into the fines in a mechanical state from the blast. While I was there the fines were cleaned and assays made of the dust, showing in vertical fine \$79 per ton in silver, and a large percentage of iron, and in horizontal fine \$55 in silver, and but little iron. This material, of which there is quite a large amount now on hand, is steadily increasing; it is all saved, and will, in due time, be put in shape to extract the silver from it, by combining it with lime or by some other process, and passing it again through the furnaces. This material, in connection with a furnace, is like the slum or tailings from a mill, only it is much richer in silver.

Nothing is lost about a well constructed and managed furnace. In time everything is utilized. This dust will require experimental examinations and tests which are in progress.

The matter of cost of charcoal at furnace at \$38 per ton, delivered, also of wood at

28 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

\$11 per cord, attracted my attention, and I investigated it closely, with the following results, which I submit to the board for general information. The following is a memorandum of actual cost:

COST OF TWO PITS OF COAL TURNING OUT 20 TONS, REQUIRING 50 CORDS OF WOOD.

Cutting and gulching 50 cords of wood, at \$2.50 per cord.....	\$112 50
Placing wood in pits and covering, 8 days, at \$3	24 00
Board, 8 days, at \$1.25	10 00
Cutting boughs for covering coal-pits and covering the same with earth, 16 days, at \$3 per day.....	48 00
Board, 16 days	20 00

Cost of pits ready to burn	214 50
Burning two pits takes 20 days' labor, at \$3.....	60 00
Board, 20 days	25 00
Add lost time and delays.....	10 50
Sacking, 41 sacks per ton, 20 days' labor, at \$3.....	60 00
Board, 20 days	25 00
Wear and tear of sacks, twine, &c.....	10 00

Actual cash cost at pits, in sacks	405 00
Equal to \$20.25 per ton.....	20 25
To this must be added for contingencies, such as bad burning, lost time, and other matters, say per ton 75 cents.....	75
Profit of master coal-burner per pit \$20, equal per ton to.....	2 00

Fair cash cost per ton in sacks at pit.....	23 00
Add for packing to wagon-road, and from thence to furnace 15 miles, per ton.....	12 00

Cost to contractor, delivered at furnace.....	35 00
To this add for profit to contractor to pay him for his time, opening roads, &c.....	3 00

Makes total cost at furnace, present price.....	38 00
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It cannot be done for much less, and if any change takes place it will probably be an increase in price, as the wood nearest to furnace and easiest of access is of course first taken. The foregoing prices are actual cash cost.

Cost of 1 cord of wood at furnace:	
Cutting cord of wood.....	\$2 50
Gulching it to wagon-road.....	1 00
Transportation.....	7 50
Cost at furnace.....	11 00

The cord does not contain 128 cubic feet. It is generally short of four feet in length, and I should say the average cord contains 100 to 110 cubic feet only. This cost will not decrease.

I examined the supply of timber on Coso Mountain, where present supply of coal, wood, and timber is drawn from. It may last the drain upon it for two years, not more, with three furnaces running.

The certainty that the supply will be exhausted within a comparatively short time, and with increased cost, consequent upon exhaustion of timber easiest of access, led me to examine other sources of supply. On the eastern side of the Sierra, west of Owens Lake, in the cañons and along spurs of the mountains there are very large quantities of timber. It is, however, far removed and difficult of access. Mr. Stevens, who lives on the eastern side of the lake, owns a large amount of this timber-land and has constructed a flume from it, some fourteen miles long, to the foot of the mountain, within two miles of the lake, and at present floats large quantities of lumber down the flume from his saw-mill.

He will contract to deliver 100,000 bushels of coal, not less, but as much more as we want, on the east shore of the lake, about seventeen miles from furnace, for 25 cents per bushel, in sacks, we to return the sacks. He will erect fixed kilns of brick and furnish kiln-burned coal instead of pit-burned coal.

The present coal weighs about 17 pounds per bushel, and there is quite a loss in fine coal and dirt. Kiln-burned coal would, it is estimated, weigh 20 pounds per bushel, and there would be less loss in dust, as it would be entirely clean.

Taking the cost of this coal in sacks, at the embarcadero on eastern shore of lake, at 25 cents per bushel, it would amount per ton to	\$25 00
It would cost us with our own teams, so arranged as to take 10 tons at a load, to transport to furnace, per ton	6 00

Making total cost at furnace.....	31 00
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The transportation might be done for less, but it would be safe to assume it at above rates. This coal would certainly be worth 5 per cent. more, and I think 10 per cent. more, than pit-burned coal, if made from same quality of wood, and it would be safe to assume kiln-coal at \$30 per ton, as against present coal at \$38 per ton, making a saving to us in coal of at least \$1,200 per month in each furnace running steadily. If we hired the hauling it would cost more. There is no danger of a dearth of coal, or wood, or timber for our uses and purposes for many years to come.

The average of twenty-five assays of ore from December 1 to December 15 was \$258 per ton; the highest being \$1,379, and the lowest \$5.65. Bullion-assays were as follows: November 19 to 24, 300 bars No. 1, (24,484 pounds,) \$313; in December, 500 bars No. 2, \$235.94; in December, 1,000 bars No. 3, \$326.81.

In the same district (Darwin) the Coso Consolidated Company have erected furnaces and developed its principal mine, the Bella Union. This mine is reported as yielding ores which assay from \$200 to \$300 silver per ton.

In the absence of a report from the company's engineer, I have condensed the following description of the Defiance Company's works from the Coso Mining News of December 24, 1875:

The main building is in size 60 by 80, and 27 feet in height from the floor to the comb of roof. The material used in its construction is all lumber excepting the roof, which is covered with heavy sheet-iron. The frame of the building is of solid timbers securely fastened together, and the outside is sheathed with boards set upright. The ore and feeding room is inclosed and separated from the other portions. It occupies nearly one-third of the building, and is conveniently arranged for the reception of the ore and charcoal. On this floor is placed one Wheeler's patent rock-breaker, through which all the hard ore will be passed and reduced to facilitate smelting. It is driven by a belt running over a pulley attached to the main shaft, and can be run or stopped at pleasure. From this floor the ore and coal are fed into the furnace through an opening in the stack 2 by 3 feet in size, and drops a distance of 13 feet to the bottom of the furnace within the fire-chamber. On the lower floor of the building are situated the engine and boiler, the blower and the furnace. The engine is of 30 horse-power, and is supplied with steam from boilers of sufficient capacity to generate all that is required. Its principal use will be to drive one of Baker's (No. 5) patent blowers, which will furnish a blast of thirty-six ounces to the square inch. From this blower a galvanized-iron tube 15 inches in diameter leads to the furnace, conveying the blast to the five tuyères that lead to the flame.

The furnace is constructed with great care, to insure perfect success in working the Defiance ores. Its foundation is of brick, raised but a few inches above the floor. The lower part of the fire-chamber is of fire-brick, 13 inches in depth, upon which rests the water-jacket, 34 inches in height. It is constructed of the heaviest boiler-iron, is steam-tight, and about 5 inches in thickness. A cold stream of water is forced into this constantly by a force-pump, and as fast as the warm water is displaced it is conveyed by pipes back into the tanks from whence it first came. Any steam that is generated passes through other pipes into a steam-drum situated just above, from which it is conveyed by steam-pipes to the principal boiler. Above the water-jacket is a section of fire-brick, 16 inches in thickness, forming a portion of the main stack, and connecting this portion with the brick chamber above the diaphragm is a tubular casting 3 feet in length, so constructed because at this point the most friction is created when the furnace is charged. Above the diaphragm, which is supported by four cast-iron tubular columns, is a brick chamber 5 feet in height, on top of which rests the down-cast, a large hollow chamber in which the smoke-stack enters and ends near the top in an open hood that catches and precipitates the dust in the chamber, which terminates at the top in a funnel shape, to which the smoke-stack is attached, and continues a distance of 30 feet higher. This makes the entire height of the stack, from foundation to summit, about 53 feet. The down-cast is the peculiar feature of this furnace, for by its use is obviated all necessity for long and expensive flues or fume arresters, in which to catch the finely-pulverized dust which is carried upward by the intense heat and violent draughts. The dust is in this precipitated when it strikes the open hood, and, falling into the chamber, is drawn off through a spout placed at the extreme termination of its inclined base and saved for manipulation. Among the improvements deserving of mention, is an improved truck and slag-pot. The truck is so constructed as to

be evenly balanced when carrying the empty slag-pot, and is easily handled by an ordinary workman. The slag-pots are quadrilateral in form and composed of five iron slats kept in place by bolts. If either of these plates are broken, they can be duplicated without the loss of all, and are thereby made a great improvement over the old style, which is conical and cast in one piece.

From assays made recently the galena and carbonate ores mingled showed returns of 55 per cent. lead and \$218.70 silver per ton. The galena-ore alone gives 58 per cent. lead and \$139.17 silver per ton, while the carbonates yield 7 per cent. lead and \$78.50 silver per ton. The raise at the further end of the tunnel is being driven vigorously, and has now reached a point 55 feet above the tunnel. The winze in the south drift is progressing finely in ore of good quality. At a point 55 feet below the drift a level is now being run south, which is now in 15 feet. It is being driven across the ledge diagonally from the hanging wall to strike another winze 100 feet farther south that is to be sunk on the foot-wall at that point. The light carbonate-ore found in this winze assays 40 per cent. lead and \$81.68 in silver. The main south drift is still yielding ore of heavy galena mingled with spar. The assays from this part of the mine yield a higher per cent. of lead than any other point, and show as follows: Cube galena, 70 per cent. lead and \$89.52 silver per ton; fine galena, 58 per cent. lead and \$96.81 silver per ton. The average assay of samples taken from all parts of the mine and pulverized together gave the following result, viz, 60 per cent. lead and \$85.84 silver per ton, which is far beyond the average results obtained from mines of this character. A rich body of carbonate-ore has been struck in the drift leading south from the winze, which is now the point of deepest working in this mine. Assays from the ore taken from the face of this drift gave the following result, viz, \$1,225.29 in silver, and 56 per cent. lead to the ton, which is the highest yet obtained. Another assay, made from ore apparently containing nothing but iron, which overlies this rich deposit, gave the result of 68 per cent. lead and \$196 in silver per ton.

Cerro Gordo district.—I am indebted to Mr. E. F. A. Hehner, of Cerro Gordo, for the following statement and tabular returns of mines in that district. Cerro Gordo is situated on the ridge of the Inyo Mountains, opposite Owens Lake, at an altitude of about 8,000 feet. The district has now been in existence about ten years. Like most camps in this part of the country, it was discovered by Mexicans. They worked the ores in a very primitive manner for some time by *casos*, until Messrs. Beaudry and Belshaw arrived here, put up smelting-works, and after a great deal of experimenting succeeded in fluxing the ores. Since that time they have been the only company here doing business of any amount, running two furnaces. About four years ago another company, the Owens Lake Silver and Lead Company, was started, and erected smelting-works at the shores of Owens Lake, some 8 miles from Cerro Gordo. Their ores, however, are obtained from Cerro Gordo, from the Santa Maria and San Felipe Mines. Outside of these two companies no smelting-works have been erected, and no mines, except such as they control, have been worked to any extent.

The character of the ore, with the exception of the San Felipe, San Lucas, and San Ignacio Mines, is argentiferous galena, averaging very high in silver and lead. The Union Mine, the principal one of the district, is valued by the owners at \$1,500,000, and has been famous for its large chimneys of lead-ores and the facility for extraction. It has been said that half a dozen men could take out enough ore to keep two furnaces running. The profits of the mine have been very great, and a large amount of bullion has been shipped. For months the average yield of bullion of the two furnaces has been over 500 bars of from 90 to 100 pounds each, every 24 hours, the bar being worth over \$100.

For about two years past, however, the camp has been very dull, in consequence of litigation between the San Felipe and Union Mining Companies for the possession of the Union Mine. As a result, the Union Mine has been shut down, and only one furnace is in operation at present. The ores worked now are mostly of very low grade, obtained by the overhauling of old dumps.

Although there are a great number of very promising prospects and claims owned by other persons, the policy pursued by the owners of the two furnaces rendered it impossible for mine-owners to work their claims.

Some 3 miles east of Cerro Gordo are the silver-mines of Belmont. From here Messrs. Beaudry and Belshaw received their supply of silver-ore. The character of the ore there is a high-grade copper-silver-glance, and a very good free-milling ore. The ores will average from \$200 to \$300 per ton, assay-value; but the veins, though well defined, are small. The principal mines there are the Buena Suerta, Belmont, Wedekind, Nettie, and Gracewood. A large amount of work has been done there, the Belmont, Wedekind, Nettie, and several others, as well as the Buena Suerta, and the Gracewood. There must have been at least from \$60,000 to \$70,000 worth of labor done there; but, with the exception of the Buena Suerta, which is worked alone by the owner, they are all lying idle, and have been so for years. If the miners want to dispose of their ores, they must do so to Messrs. Beaudry and Belshaw, and they cannot afford to take the ore out at the prices offered to them. The price charged for reduction is (according to Mr. Hehner) \$50 per ton.

During the last three or four months quite an excitement has prevailed in the camp in consequence of the finding of very rich specimens of a porous iron-ore coming out of the casing of the Jefferson lead-mine, which is exceedingly rich in free gold. A great number of specimens have been picked up on the old dump of that mine, which were worth from \$5 up to \$80 and \$90 each. Here, also, Mexicans were the discoverers, and it is the current opinion of well-informed persons here that from \$20,000 to \$25,000 of gold must have been taken out. All the ores contain more or less gold, and probably this made the value of Cerro Gordo bullion so high in San Francisco.

There is another difficulty which Cerro Gordo is laboring under, viz, the scarcity of water. Two years ago Mr. Temple, of Los Angeles, and Mr. Craig bought some springs, 7 or 8 miles distant, and brought the water to town, but they were obliged to give up the business this summer on account of the dullness of business and the scarcity of water in their springs. Since then Messrs. Beaudry and Belshaw have laid pipes from another spring some 4 miles distant, and are now also supplying the camp with water, which is sold for 3 cents per gallon.

In the early part of November two or three gold-bearing ledges were located, assaying about \$15 to \$20 per ton, but as a matter of course they cannot as yet be profitably worked. When the two, or rather three, furnaces were running—the one at Swansea included—and the Union, San Felipe, and Santa Maria Mines were being worked, the place gave employment to from 500 to 600 men—miners, furnace-men, coal-burners, and packers. Now there are not 60 men employed. Charcoal is worth about \$35 per ton. The wages of miners and furnace-men are \$4 to \$5 per day for eight-hour shifts. Mining is, however, mostly done by contract; and good workmen may earn as high as \$10, or even \$15, per day on contract-work.

Mr. William Crapo, of Cerro Gordo, has furnished me the following statement of the shipments of bullion from that district during the year 1875:

From Belshaw & Judson's furnace 2,937, ²¹⁸/₁₀₀₀ tons, containing an average of 126 ounces of silver per ton of 2,000 pounds. From Beaudry's furnace 661, ³⁷⁷/₁₀₀₀ tons, containing an average of 147 ounces silver per ton. Total, 3,598, ⁵⁹⁵/₁₀₀₀ tons.

The lawsuits which have been hindering the bullion-production for several years past having been finally settled by a consolidation of all

the interests, there is a probability of a greatly-increased production during the coming year.

Description of leading mines in Cerro Gordo district, Inyo County, California.

(Reported by E. F. A. Hehner.)

Name.	Owners.	Length of location.	Course.	Dip.	Length of pay-zone.	Average width.	Country-rock.
		<i>Feet.</i>			<i>Feet.</i>	<i>Feet.</i>	
San Felipe	Swansea Silver-Lead Mining Company.		N. W. and S. E.	89° S. W.	200	2	Limestone and slate.
Gracewood	Mr. Helmer	1,500	N. E. and S. W.	70° S. E.	300	2	Syenite.
Union	M. W. Belshaw and V. Beaudry.	1,800	N. and S.	80° W.	300	10	Limestone.
Buena Vista	H. W. Gould	1,400	N. W. and S. E.	70° N. E.	150	2	Syenite.

Name.	Owners.	Vein-matter.	Cost of hoisting and pumping machinery.	Greatest depth attained.	Greatest length of horizontal exploration.	Number of levels.	Length of tunnel.	Cost of tunnel.
				<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>	
San Felipe	Swansea Silver-Lead Mining Company.	Argentiferous quartz.	None..	80	200	1	100	\$1,500
Gracewood	Mr. Helmer	Argentiferous gray copper.	None..	150	350	1	650	7,000
Union	M. W. Belshaw and V. Beaudry.	Argentiferous galena.	\$10,000	700	400	7	300	4,000
Buena Vista	H. W. Gould	Auriferous and argentiferous quartz.	None..	150	300	6	600	7,000

The operations of the Union Mine are reported as follows: About fifty miners, at \$4 per day; cost of sinking, per foot, about \$10; of drifting, about \$7.50; of stoping, per ton, about \$2.50; of mining, per ton, \$5; of smelting, about \$15.

The Mineatta Mine is situated in *Lookout district*. Length of location, 1,500 feet; course, N. and S.; dip, 42° W.; average width, 30 feet; length of pay-zone unknown; formation, limestone; vein-matter, silver-bearing quartz; worked by shaft to depth of 100 feet. Mr. James Dolan, the superintendent, says this mine has been opened in three different places, and at each point large chimneys of very high-grade ore have been exposed. It is difficult to estimate the quantity in sight on the surface near these openings, but the closest surveys show not less than 3,000 tons of ore that will yield fully \$100 to the ton. Much of it is rich in galena, but the higher grades carry a combination of gray carbonates and chlorides, while the latest developments show extremely rich black sulphurets. The Mineatta shows prominent crop-pings for a distance of 3,000 feet.

MONO COUNTY.

This county lies on the eastern slope of the Sierra Nevada, bordering on the State of Nevada. It is situated immediately north of Inyo County and east of Tuolumne and Fresno. It lies wholly beyond the main ridge of the Sierra, the crest of that range forming its south-

western border. Its easterly portion is traversed longitudinally by the White, the Inyo, and several other chains of mountains, and its western portion contains several of the highest peaks of the Sierra, some of them having an altitude of 15,000 feet. The mineral resources are extensive and but slightly developed, but are now attracting considerable attention in consequence of the remarkably favorable development of the Indian Queen, the Comanche, or Mack, and other mines in the White Mountain range near Benton. The ores of this county are argenteriferous.

Since 1870 there have been erected six mills, aggregating fifty stamps. During the past year about 5,000 tons of ore was crushed. The ores are of high grade and require roasting. One of the most important districts is Oneota, situated in the White Mountains. This is not a recently-discovered mining-district. The mines in this section have been worked more or less for the last twelve years. Yet it is comparatively unknown outside of the county, and it is only within the last eighteen months that any real mining has been done or capital invested in this section. Heretofore the mines have been worked only in a small way and have been entirely self-sustaining. But now, with the aid of steam hoisting-works and better mills, the mines are yielding remarkably well.

The principal mines worked here at present are the Indian Queen, owned by a San Francisco company; the Comanche, owned by Albert Mack, of Benton, Cal., and the Diana, owned by A. W. Williams, of Benton. The Diana runs a five-stamp mill. The Comanche and other mines support a ten-stamp mill. The Indian Queen has at present only a four-stamp mill, but it is the intention of the company to erect next spring much larger works, as the mine can now easily produce twice the amount of ore the present mill can reduce. Yet even with these small and insufficient reduction-works, the Indian Queen is paying dividends of \$30,000 per month.

Mr. John Howell, superintendent of the Indian Queen, writes as follows concerning that mine:

The Indian Queen Mine, situate in the White Mountains, about fifteen miles east of Benton, Mono County, California, is a vein of from 2 to 3½ feet in thickness. Course of vein northwest and southeast; dip, 30° east; country-rock, talcose slate. It is a well-defined fissure-vein. The ore is a heavy base sulphuret, of about the following proportions: Lead, 37 per cent.; copper, 7 per cent.; iron, 12 per cent.; zinc, from 8 to 14 per cent.; antimony, 3 to 7 per cent.; sulphur, 8 to 10 per cent.; a little arsenic; no gold, and about \$200 per ton in silver, the remainder being clay and quartz. The ore is very rebellious and difficult to work, but when properly treated yields a high percentage of the precious metal. Our average yield of silver is about 90 per cent. We chloridize our ores in a Howell's improved White's furnace, which is also the method of treating ore at Mack's Mill in Benton. Within the last year several mines have been discovered between here and Owens River Valley, on the western slope of the White Mountains, and in the near future this promises to be a rich and extensive mining-section.

The Indian Queen employs 20 miners, at \$4 per day; cost of sinking, \$6 per foot; drifting, \$3.50; stoping, \$5.50 per ton; mining, per ton, \$8 to \$10. The cost of milling, including roasting, is stated to be \$32 per ton. The average yield per ton is \$180. The present mill has a capacity of 5 tons per day. This company may be relied on for a large bullion-production in 1876, when the new mill will be in operation.

There are several other valuable mines in the county, among others, the Comanche, from which no returns were received. The Dunderberg, a promising property, was described in the report of 1873, page 17. Since that time nothing has been done on this mine in consequence of the failure to obtain profitable results by the common mill-process.

SAN DIEGO COUNTY.

The important gold-producing regions of Southern California are within the limits of San Diego and Kern Counties. San Diego has eight quartz-mills, and during the last two years has crushed about 10,000 tons of quartz per annum. From 1870 to 1873, during the prevalence of a quartz excitement, there were erected in this county ten mills, aggregating 60 stamps, at a total cost of \$80,000. Most of these mills are idle, and none of the mining operations have proven permanently profitable. The characteristics of the quartz-mines and the record of the principal ores may be found in the reports of 1871 and 1873. Since that period the gold product has materially fallen off. The principal mine, the Charlot Mill and Mining Company, has since its incorporation levied \$48,000 in assessments and disbursed \$51,000 in dividends, the last dividend having been declared in 1874. This mine has attained a depth of 300 feet and has a fine 10-stamp mill. Prospecting has been actively resumed during the past year, in some cases with favorable results. The Ready Relief Mine recently crushed 100 tons of ore yielding \$30 per ton, and has large reserves in sight. Several other mines have developed extensive reserves of ore which will yield from \$20 to \$30 per ton.

KERN COUNTY.

Kern County, having an area of 8,000 square miles, comprises within its limits the southern terminus of the great valley of the San Joaquin; it contains valuable gold-mines, both quartz and placer, and large deposits of salt, sulphur, petroleum, and other minerals. The county had in 1875 twelve quartz-mills, which are reported as having crushed 25,000 tons of ores for the fiscal year ending June 30, but as the mill of the Sumner Mine commenced crushing about that time, the product for the year ending December 31 would be largely increased. This mine, one of the most important in the State, by reason of the great width of its vein and the magnitude of its operations, was fully described in the report for 1875.

A correspondent says of this property:

The Sumner Mining Company is doing a great deal of work. It employs 170 men. The eighty-stamp mill, which is the largest and most complete on the coast, is in constant operation, crushing from 100 to 120 tons per day. The mine is situated about three-fourths of a mile above the mill, and the machinery, including the pump, hoisting-works, &c., is in all respects first class. We entered the first or 80-foot level through a tunnel of about 200 yards in length, through which the ore is taken out, and the mine drained of the water. A great quantity of ore has been taken from this level. From this point we descended 80 feet in the hoisting-works to the 160-foot level. This level has been worked at a distance of 500 feet on the other side, embracing an entire length along the body of the ore of 1,000 feet, and measures wherever cut through from 30 to 40 feet in thickness, although the pay-rock in some places appears to run in strips or veins, and again widens out to the entire thickness. A depth of 200 feet has been reached, and the prospects continue to improve. The east casing of the quartz-vein is clay. At the mouth of the tunnel before spoken of is a large dump, where the car from the mine is unloaded, and a chute from this opens into a car that runs to the mill. The road from the dump to the mill is laid with small iron railing, and the grade is such that the car runs with its own momentum, and is drawn back by horse-power, so that the cost of carrying the rock to the mill does not exceed \$5 to the one hundred tons. The rock enters the dump at the mill, where it is deposited above the level of the building, and at an opening at the bottom of the dump the rock is taken out and passes through a rock-breaker and then drops into a car, which passes along the line of eighty stamps, and is deposited into a hopper provided for each five stamps. From here it is thrown into the battery by a self-feeder. The whole works, from the mine until the gold is extracted, are constructed on the most simple and economical plan. The quartz-mill is run by water, which is abundant at all seasons of the year. There is one difficulty attending the work in the mine, and that is the great amount of water.

It requires a pump with an 18-inch pipe, making fifteen strokes per minute, working continuously night and day to keep the water out of the shaft. Several other shafts and tunnels are being run on the same lead, and the erection of other mills and works is contemplated.

The trouble from water, as I learn from the best authority, has seriously hindered the operations of the Sumner Mine. At the end of the year the water was 130 feet below the adit-level. A 16-inch pump, in addition to the 12-inch now running, was to be put in. The new mill was run from June to the end of the year on the very low-grade ore, (partly above and partly below adit-level,) which has yielded not quite \$1,000 per day. The bottom of the shaft is in ore of high average, and the water once controlled, large returns are expected.

The Consolidated Bunnell has made arrangements for a ten-stamp mill, which will be in running order by the 1st of February, 1876. The main tunnel was run in 148 feet and tapped the vein. From this point the company turned at right angles, and is running a tunnel along the foot-wall and following a rich vein of ore about two feet wide. They have thus followed the lead about 35 feet and have taken out three hundred tons of rich ore. The vein contains horn and ruby silver. The remainder of the lead is not so rich, but will pay well for working. J. S. Colling, in prospecting the lead, found croppings extending two miles beyond the 12,000-foot location. At one place the croppings were about ten feet wide on the surface, and pieces taken from them assayed \$137 to the ton. These croppings run in a straight line, passing directly over the top of the mountain. The other side is covered with the *débris*, and the vein is lost.

Mr. Jacobs, who represents a San Francisco company, has recently visited the Hot Springs Valley and the placer-mines on Kern River below, examining the mines with a view to putting through the McCann ditch, which will be about nine miles long, and will cost about \$18,000. It is designed to supply all the placer-mines of that country with water, and will also furnish water in all probability for irrigating purposes in Hot Springs Valley. There are about forty acres on this claim, all rich gravel-diggings. It includes three or four different bars, among which are Oiler Bar and China Bar. The gravel is supposed to be from 5 to 95 feet deep. The bars and small gulches on Kern River in this vicinity are being worked by the Chinese, who are seen everywhere with their rockers and sluice-boxes.

The Saint John Mining Company, at Sageland, expended from \$50,000 to \$60,000 in putting up hoisting-works, pump, &c. They are now down 720 feet, where the vein is from 4 to 4½ feet wide, and said to be very rich. This is the deepest mine in the county. A twelve-stamp mill with three batteries was reported ready to start up; but at the close of the year I learned that the mine was shut, and that it was somewhat doubtful whether it would ever be opened again. Of the precise nature of the disappointment or difficulty which led to this suspension I am not advised.

The Bright Star Mine, located at Piute, eighteen miles from the Hot Springs, is running fifteen stamps on rich ore. The shaft is down about 350 feet on the vein, which is 8 to 12 feet wide. The company has already realized from this mine from \$250,000 to \$300,000. A number of other mines are worked in the same neighborhood with arrastras.

San Bernardino attracted some attention last year as a field for quartz-mining operations, and a forty-stamp mill was erected by the Gold Mountain Company, near Bear Valley, at a cost of \$100,000, and with a crushing-capacity of 100 tons per day. The enterprise proved a fail-

ure, owing to the indiscriminate working of masses of barren quartz. The quartz-zone of this district is of great width, but the system of pay-shoots, if such exists, was not discovered by the managers, or at least was not developed.

San Luis Obispo, a southern-coast county, has lately been the scene of great activity in quicksilver-mining. The principal mine, the Oceanic, was described in our last Report, (for 1875.) The Tribune of December 25 says: The mining-interests of the county are growing brighter with every month's development. There is not a remaining doubt as to the fact of there being one of the richest and most extensive quicksilver-belts running through the entire length of the county that is to be found in any portion of the State. The development of these mines will greatly quicken every other industry in the county. At the present time there are probably 250 men at work in these mines, and the amount of money put in circulation through their earnings is already considerable; but let the number be increased to one or two thousand, as it well might be, then everybody would feel its influence. The Oceanic company for months in succession last summer paid as high as \$10,000 a month for wages and material, which gave a great impetus to all classes of business in and about Cambria. The Ocean View Mine has now employed 60 men, and must keep up as large a force until the works are all completed.

MARIPOSA COUNTY.

The following table, compiled from the official returns of county assessors, shows the condition of mining from 1870 to date:

Year	Quartz-mills.	Tons crushed.	Minibg-ditches.	Length, in miles.	Miner's inches used per day.
1870	30	35,000	10	66	3,500
1871	34	24,000	10	66	3,500
1872	34	18,000	10	66	3,500
1873*					
1874	27	15,000	7	45	
1875	20		7	45	

* No returns.

The principal source of gold-production up to the year 1870 was from the Mariposa estate, known as the Frémont grant, and now the property of the Mariposa Land and Mining Company. The leading mines of the company were described in the Reports of 1869 and 1871, and again in tabulated form in the Report of 1874, pages 67, 68. During the past few years the company's energies have been devoted to the running of a long adit from the mound to strike the principal mines at great depth.

As early as 1858 or 1859, the late Dr. Justus Adelberg suggested the advisability of a tunnel from the Merced River, at the Benton Mills, along the line of the vein of quartz which was known to exist from the river to the Pine Tree and Josephine Mines, and from these last continuing southwardly to Mount Ophir, Princeton, Agua Frio, and even to the extreme southerly limits of this estate. The suggestion was not acted on at the time, but some years after was again brought to the notice of the Mariposa Company. A tunnel was commenced and then abandoned, and the enterprise was permitted to rest until June, 1873, when the work was in reality commenced. The tunnel was carried on with

occasional interruptions until June, 1874, and then, after a rest of six months, was again resumed. When it had reached a length of 1,000 feet a vein was intersected, supposed to be the continuation of the Pine Tree. The work at the commencement was easy, but as the drift advanced the ground became harder, until, at 440 feet, hard blue slate was encountered, and has since continued. The course of the tunnel being parallel to this stratification, in blasting the powder loses 75 per cent. of its effective force on the "center cuts." The length of the tunnel at the end of the year was reported about 1,300 feet, and the rate of progress as rather less (owing to the extreme hardness of the rock) than the previous average of 90 feet per month. A visitor informs me that the rock in the heading was so hard that a continuous circle of flame issued from the drill-holes till they had attained the depth of five or six inches, although water was poured into them while the drills were in motion. Had it not been for the Burleigh rock-drill the work would have been abandoned long since, as competent miners estimate the cost of running it at \$70 per foot. This tunnel once in, the cost of carrying it on will be defrayed out of the vein itself, for, with a down-grade to the mill, and no necessity of handling the ore twice, the quartz can be delivered at the "spaller" for less than \$2 per ton, and the cost of milling will not exceed that amount, as the principal item of expense in milling is reduced to a minimum by using the water-power of the Merced. Steps are now being taken to bring in a ditch, which, besides furnishing power to the Benton Mills, will also supply the means of working the placers above the banks of the river, which are now useless for the want of water. The amount of power to be derived from the increased fall will be nearly 3,000 horse-power. It is part of the policy of the company to utilize this power by milling the quartz furnished by the series of veins from the Merced River to Agua Frio, thus avoiding the enormous expense for fuel of about \$20,000 yearly for each mill. The canal will have a capacity of 20,000 cubic feet per minute.

During the year just past the company has driven the main drain and working-tunnel above alluded to 750 feet, but the real working-time has been but little over six months, as the old Benton dam had to be rebuilt, thus taking away for a considerable period the power used in compressing air, &c. The Pine Tree fissure was cut and crossed at 1,000 feet. It showed a small vein of about six inches, well defined and carrying sulphurets. Assayers at the New York assay-office pronounced it regular ore and containing \$9 per ton in gold. The position of the vein is the same as had been calculated according to the surveys and surface-observations. Now, following on the vein, which widens as it advances, there are still 200 feet to drive before reaching a point under the first outcropping. The drifts will then have "backs" of 500 feet vertical height, with a 3-foot vein on the surface. Parallel to this and 250 feet distant is a 4-foot vein, for which a cross-cut is now running, and toward which it has advanced 126 feet.

From these outcroppings to the old Pine Tree the surface-indications are continuous and well-defined.

Prospecting-drills will be used after January 1, to make a thorough examination of the best-appearing veins on the whole estate. Preparations are making to sink on the well-known Princeton vein to the depth of 1,200 or 1,500 feet. This will allow an undercutting of the old works from 800 to 1,000 feet. At the time this mine was closed, it is said an extensive 4-foot vein of \$12 to \$15 rock was abandoned. This was six years ago, when the cost of mining was high, but by means of the Bur-

leigh drills and compressed air from the Merced the cost has been greatly reduced.

In the River tunnel, with a heading 8 feet by 12 feet, the lowest offer by hand labor is \$70 per running foot, while by machinery the *total* expense is \$34.50, as shown during the past six months. This includes everything—rails, ties, car-repairs, some timbering, powder, &c.

The principal mines near Coulterville, in this county, were described in tabulated form in the report of 1875. During the past year but little has been done in this portion of the county. There are many valuable mines in this district lying idle owing to litigation and bad management. The Douglass and the Maxwell Creek Mines will resume operations early in 1876. Their mills are only one mile from town. These mines have a good record. The Hasloe and Bandereta Mines are ten miles from town, and have ten stamps each running. The Martin & Walling Company will resume early in 1876. The Ralston Marble Spring Mine, two miles from Bower Cave, is said to be valuable. The McAlpine, five and a half miles from Bower Cave, has turned out well. Dr. McLean's Mine, near the last, looks well. The Coulterville Mill and Mining Company, ten miles from Bower Cave, is running a ten-stamp mill. The Crow lead is three miles from town. There are some others of less note in this vicinity. Coulterville is a distributing-point for a large region, supplying camps twenty or twenty-five miles around.

The principal mines in the vicinity of Hornitos are the Washington, Hardwick No. 9, the Spring Ledge, Gulch, Silver Lead, the Gaines, Campidónico, Dause, and a few others of less note. The Washington, one and a half miles from town, is a good mine. They are working on the 700-foot level. Their last clean-up (November, 1875) yielded \$7,800 from 350 tons of rock. They work 75 men—25 Chinese. Their greatest drawback is fuel. Wood costs \$50 per day. Their rock is sulphuret, and they have extensive chlorinating-works. Their engine for pumping is 70 horse-power; for quartz-mill, 70 horse, and for the hoisting-works, 25 horse. The engine for the mill will drive forty stamps; they now run but twenty stamps. The Campidónico runs five stamps; the Hardwick, five stamps, and the Gaines, ten stamps. The Gulch Mine will erect a ten-stamp mill early in 1876.

Through the courtesy of the owners and of Capt. J. H. Riley, of San Francisco, I am enabled to present an abstract of the report of Mr. James D. Hagne, M. E., on the Hite's Cove Mine, which was described in the report of 1875, and which may be considered as one of the leading quartz-mines of the State.

The Hite Mine is at Hite's Cove, on the South Merced River, three or four miles above the junction of that branch with the main stream flowing out of the Yosemite Valley. A sharp ridge, 1,500 to 1,700 feet high, here divides the two streams. The vein on which the mine is worked crops out high up on the north side of this ridge, overlooking the South Branch. The outcrop of the vein follows an early east and west line along and dipping (northerly) steeply into the hill. The mine is opened by two tunnels, which enter the hill through country-rock at right angles to the vein. Both tunnels are so situated that they cut the vein near the center of the claim, which is 1,000 feet in length; there are, therefore, about 500 feet of ground on either side of the points in the vein thus intersected. The lower tunnel, through which the mine is now chiefly worked, is about 500 to 550 feet vertically above the bed of the river. The upper tunnel is about 565 feet above the lower, or about 586 feet when measured on the dip of the vein, say 75 degrees. The croppings are from 125 to 200 feet above the upper tunnel.

The upper tunnel is about 300 feet in length. From the point of its intersection with the vein a drift has been driven along the vein east and west over 300 feet in each direction, developing two shoots of ore, one in each end of the mine. These shoots have each been stoped out for a considerable length between the tunnel and the surface. The lower tunnel is about 1,400 feet in length. From its point of intersection with the vein drifts have been run each way nearly, if not quite, to the bound-

ary-lines. The two tunnels (586 feet apart on the dip of vein) are connected by the works in the western half of the claim, where a fine body of ore has been developed and partly worked out. The eastern half of the mine is not so far developed. The lower tunnel shows a strong vein of quartz that assays well, but the ground there between the two tunnels remained almost untouched at the date of the writer's last visit, June, 1875. Below the lower tunnel no work whatever had then been done.

The nature and extent of the development in the mine in June, 1875, may be partly described as follows:

On the level of the lower tunnel, drift west to boundary-line, nearly 500 feet.

On the level of the lower tunnel, drift east about 400 feet.

Above the level of the lower tunnel a series of winzes connect with the upper tunnel, starting from the lower level at a point 150 feet west of the lower tunnel.

On level 84 feet above lower tunnel, drifts east and west from winze, aggregating 184 feet.

On level 190 feet above lower tunnel, drifts east and west from winze, aggregating 430 feet.

On level 265 feet above lower tunnel, drifts east and west from winze, aggregating 100 feet.

On level 343 feet above lower tunnel, drifts east and west from winze, aggregating 335 feet.

On level 432 feet above lower tunnel, drifts east and west from winze, aggregating 208 feet.

On level 496 feet above lower tunnel, drifts east and west from winze, aggregating 256 feet.

On upper tunnel, 586 feet above lower tunnel, drifts east and west from winze, aggregating 700 to 750 feet.

These drifts, with their connected winzes, cross-cuts, and stopes, afford the following observations on the character of the vein. The inclosing country-rock is black slate; general course of vein regular, and nearly east and west; dip to the north 75 degrees from the horizon; width, varying between extremes of a few inches to over 20 feet, averaging where stoped 5 to 6 feet. The quartz occurs in shoots, pinching and widening at greater or less intervals. The main west shoot, which has been thus far the chief source of quartz, has been opened in length from 100 to 250 feet on different levels. On the bottom level this shoot has a continuous length of 250 feet. The quartz also sometimes forms two or more parallel veins or seams, so that within the space included between the main hanging and foot walls of the vein there may be two distinct bodies of quartz separated by a horse of slate. In the upper works there have always been three separate seams recognized, although only two have been much worked. In the bottom level the vein, which is 15 to 20 feet wide where cut by the tunnel, is divided by a large horse in the western portion of the ground. The general character of the quartz throughout the mine is moderately hard, white or bluish-white, sometimes mixed with seams of slate, frequently showing free gold, with some iron sulphurets and a little galena. The quality varies between wide extremes, say from \$10 to \$100 per ton. The average of several years' operations appears to show a yield of \$30 to \$40 per ton. At the end of 1874, a careful estimate of the amount of quartz thus far worked showed a product of, say, 30,000 tons, yielding over \$1,250,000, or something over \$40 per ton. According to the reported operations of this year, (1875,) this yield has been fully sustained. It is especially noteworthy that nearly all the quartz taken from the mine is crushed without any discrimination or assortment. The dumps show very little or no quartz. The yield obtained is the result of milling the whole vein.

The mine has been known and worked since 1862. Its early history is unrecorded, and its production can only be stated in general terms. In later years the billion-production is given as follows: 1869, \$39,171; 1870, \$126,902; 1871, \$138,567; 1872, \$133,782; 1873, \$136,125; nine months of 1874, \$112,942. The total product from the beginning to the end of 1874 is placed at something over \$1,250,000.

The costs of operation are known in detail for only two or three years. Including all expenses for mining and milling, dead-work, permanent improvements, &c., these were reported as follows:

In 1872, \$42,792.78, estimated per ton at \$17.11.

In 1873, \$53,585, estimated per ton at \$17.86.

In 1874, (9 months,) \$31,063.32, estimated per ton at \$10.

The estimated net profits per ton of quartz crushed during the same period were as follows:

In 1872, \$36.38; 1873, \$27.51; nine months of 1874, \$30.33.

The net profits of the year 1874 are reported at \$120,000.

The mine is provided with a mill, which is situated near the river-bank and directly below the tunnel-mouth. The ore is brought out from the mine on a tram-way, and is sent down to mill by an inclined road without change of cars. The mill has twenty

stamps; but as all the ore is ground in pans for the purpose of dividing it finely, and of affording abundant opportunity for amalgamation, the duty of the mill is very light, not exceeding (in 1874) 330 tons per month. The cost of milling alone is said to average about \$3.75 per ton. The mill is driven by water-power, obtained in abundance, during most of the year, from the South Merced. At the present date (1875) the milling-facilities are being increased by the addition of twenty new stamps. With these in operation it is expected that the monthly production will be from \$30,000 to \$40,000.

The mine in its present condition is able to furnish a much larger supply of ore than is called for by the present scale of operations. In 1874, when visited by the writer, the total force employed was 34 men, of whom only 10 were miners; the remainder comprising 9 trammers, 6 mill-men, 1 tailings-man, carpenter, smiths, foreman, cooks, and jobbers. Of the mining-force, only 4 were stoping, 5 were breaking quartz in opening ground, and 1 on dead-work. This force, without working nights or Sundays, kept the mill fully supplied.

At that date the developed reserves of quartz standing in the opened ground were estimated at 30,000 to 40,000 tons, and valued at \$750,000 to \$1,000,000 net.

The promise of the mine for the future, beyond these developed resources, was unusually good.

TUOLUMNE COUNTY.

This county was described at length in my report for 1872, since which time there has been little change in the condition of mining there. There are in the county twenty quartz-mills, most of them working irregularly, and crushing about 15,000 tons per annum. The bullion-yield from this source will be materially increased next year (1876) by the working of the Confidence Mine, which has developed large ore-bodies during the past year. This important mine was fully described in my last year's report by Professor Ashburner. The principal mines are the Confidence, Spring Gulch, Golden Gate, Soulsby, and a group of mines on the Mother lode, which passes through this county, all of which have been described in former reports. Gravel-mining under Table Mountain has been carried on extensively, but no returns can be obtained. The system of working is the same as in 1872.

Mr. H. G. Wetmore, superintendent of the Golden Gate, makes the following report of his mine :

Golden Gate Mine—length of location, 2,600 feet; course, northeast and southwest; dip, west 70 to 80 degrees; length pay-zone, 100 feet; average width, 6 feet as far as explored; are still in pay-ore; country-rock, slate; vein-matter, flinty quartz; no machinery yet erected; greatest depth attained, 210 feet; greatest length horizontal exploration, 285 feet; 2 levels opened by tunnel, 285 feet long; miners' wages, per day, \$3; cost sinking, per foot, from \$15 to \$30; cost drifting, per foot, average, \$20; cost stoping, per ton, from \$1.50 to \$2; cost mining, per ton extracted, \$3.20; cost milling, per ton, \$1.25 at company's mill; number tons extracted and worked, about 500; average yield, per ton, \$14.50; percentage sulphurets, from $1\frac{1}{2}$ to 4 per cent.

Golden Gate Company's mill—water-power, 300 inches, 40-foot fall; 10 stamps, at 720 pounds, dropping 7 inches 83 times per minute; no pans; 5 concentrators; cost of mill, \$10,000; capacity, 20 tons per 24 hours; cost treatment, \$1.25 per ton; during the past year have only been experimenting; up to date the sulphurets have been sold.

Mr. Jesse Holladay, president of the Confidence Mine, makes the following return, (the bullion-product given below is the total yield since the mine passed into the hands of the present owners, in 1871:)

Confidence Mine—location, 2,500 feet; course, north 25 degrees west, dip 22 degrees east; length pay-zone 246 feet, average width 7 feet; country-rock, granite; vein-matter, quartz and sulphurets; worked by shaft 870 feet deep; 9 levels open; total length drifts, 3,300 feet; cost of hoisting-works, \$11,500; 18 miners employed, at \$3 per day; cost of sinking,

per foot, \$10; of drifting, \$8; of stoping, per ton, \$1.50; of mining, per ton extracted, \$3; of milling at company's mill, \$2.50; average yield, per ton, \$16; total bullion-product, \$550,000; kind of power, and amount, steam, 80-horse; number of stamps, 40; weight of stamps, 650 pounds; number of drops per minute, 70; height of drop, 7 inches; cost of mill, \$30,000; capacity per twenty-four hours, tons, 50; cost of treatment, per ton, \$2.50; tons crushed during the year, uncertain; making developments.

CALAVERAS COUNTY.

The assessment-list of this county shows the following valuation for 1875:

Mining-claims.....	\$118,785
Improvements on same.....	110,175
Mining-ditches.....	94,155
Total.....	323,115

The comparative condition of the mining-interest is shown by the following table, compiled from official statistics:

Year.	Quartz-mills.	Tons crushed.	Mining-ditches.	Length, in miles.	Miners' inches of water used per day.
1870.....	24	11,536	22	508	6,300
1871.....	28	19	515	5,800	
1872.....	26	37,105	22	482	3,050
1873.....	34	28,960	22	490	3,670
1874.....	40	31,000	22	490	3,690
1875.....	40	30,500	23	510	3,160

From the above it appears that there has been but little change in the general condition of mining for the past five years.

In crossing this county from the foot-hills bordering the San Joaquin Valley toward the summit of the Sierras, we find the belt of auriferous metamorphic rocks, which forms the great mining-field of Central California, having a general course of northeast and southwest. The lower portion in the foot-hills is covered only by superficial *debris*, which seems to be the remnants of broken channels which existed higher up and flowed in a general direction from north to south. In the higher portions of the county, near the junction of the slates and granite, there are isolated patches of these ancient channels covered by basaltic lava, and below these, on the limestone belt, superficial placers, which are still worked during the rainy season.

In the extreme western portion of the slate-belt we find the copper-belt, in which are situated the Union, Keystone, and other mines of note, which have remained closed for several years in consequence of the low price of copper. The ores are yellow sulphurets, known as "bronze-ores," and are inclosed in chloritic slates and serpentine. They are said to have occurred in lenticular masses and to have deteriorated in depth.

The great quartz-vein, or zone of veins, known as the Mother lode, enters this county from Tuolumne and crosses it into Amador. It makes strong croppings at Carson Hill, Albany Hill, Angel's, near San Andreas, and at Lower Rich Gulch, on the Mokelumne River. Carson Hill alone is credited with the production of \$4,000,000, but active

operations have been suspended for several years, as the free-gold-bearing character of the rock changed in depth and was succeeded by tellurides and arsenical compounds. My report of 1875 contains the results of tests of these refractory ores, but nothing has yet been done toward the permanent development of these claims. At Angel's, arrastras only are running. This place, a few years since, had five quartz-mills, aggregating 60 stamps. The condition of quartz-mining near San Andreas is noticed below in a communication from Mr. J. Rathgeb. This portion of the Mother lode carries low-grade ores near the surface, but its character at lower levels has not yet been demonstrated by deep development. The reason assigned is want of capital.

The most extensive quartz-mining operation of the county at present is the Gwin or Paloma Mine, owned by Messrs. Gwin, Coleman, and others. This is situated at the head of Lower Rich Gulch, a deep ravine debouching on the Mokelumne River. The mine has attained a depth by shaft of 1,100 feet, the lowest level yet opened being at 1,000 feet. The company owns two mills, both run by water-power, and the property is economically managed. It is to be regretted that statistics, such as are cheerfully furnished in the same character of mines on the Mother lode in Amador County, cannot be obtained from this source. They would be valuable as furnishing information on the economy of mining in low-grade ores, for the ores of the Gwin Mine have been of low grade for the most part down to present depths, and yet the business of mining has been successfully prosecuted since the property passed into the hands of the present owners. The vein is well defined and sometimes of great width. On the 800-foot level it attained a width of 18 feet, with high-grade rock. The rich-ore bodies, however, seem to occur in lenticular masses, and alternate levels are sometimes in low-grade ore. The cost of milling and mining probably does not exceed \$6 or \$7 per ton.

West Point district is situated in the eastern portion of the gold-bearing belt, in a granite formation. As a general rule the veins are narrow, but of high grade, (\$30 to \$40 per ton,) the walls hard, and the pay-shoots contracted in length. Nearly all these veins paid well until depth was attained, and mining and pumping became expensive. Many are now idle, on which expensive machinery has been erected. This is not owing to the exhaustion of the mines, but to the fact that the pay-shoots are limited in length; and can only be found by continuous sinking of the main shaft.

Several mines noticed in former reports have suspended operations, and others have been resuscitated with favorable results. Among these the Mina Rica and Okeeno are prominent. The principal works of the Mina Rica are situated on an ore-body 232 feet in length, which averages 4 feet wide, and was worked years ago to the depth of 135 feet. The new shaft is 12 feet by 4, in the clear, and is now 175 feet deep. Sinking progresses at the rate of 9 feet per week. The 40 feet of backs attained show a uniform width of 4 feet, containing 18 inches of very high-grade ore. The whole is estimated at \$40 per ton. The hoisting-works are driven by a 16-horse-power horizontal engine, consuming three-fourths of a cord of wood in twenty-four hours. Engineers act as "tub-landers." A pump is employed two hours out of twenty-four in emptying a water-tank placed at a depth of 150 feet. The company owns another mine, the Maria, about one mile west of the Mina Rica. A transverse tunnel taps the first vein at a considerable depth, and has been extended on the lode 120 feet. The ore averages 2 feet in width, and is estimated to yield \$15 per ton. The main tunnel will be extended shortly to nine other lodes, which crop east of, and parallel with, the

vein now being developed. About 400 yards south of the Maria is located the company's 8-stamp mill, driven by a large overshot wheel and free water. A Hepburn settler and two Wheeler pans are employed. This mill has done well for prospecting-purposes, but the extensive and valuable backs of the Mina Rica alone necessitate the erection of a large new mill near the mine.

A group of mines in the slate-formation has been described in former reports. The most prominent is the San Bruno, described in the report of 1875, which has been steadily worked during the present year.

The Calaveras Chronicle, a careful and reliable mining journal, makes the following statement of the condition of the principal quartz-mines of Sheep Ranch district, near Murphy's:

"Powerful steam hoisting-works have been erected on the well-known Wallace & Ferguson Mine. The engine is 45 horse-power, of sufficient capacity to admit of sinking to any required depth. The ledge—the yield of which has been remarkable from the outset—has been mined to the depth of 125 feet, a distance of 1,400 feet in length, without the aid of machinery. The mine has been very successfully worked for a number of years, and is to-day one of the most valuable mining-properties in the State. When the new hoisting-works are completed, operations will be pushed with greater vigor, and on a more extensive scale than ever.

"Work is going actively forward at the Woods Mine. Sinking has reached a depth of about 200 feet, the quartz having been of a fair quality from the surface down. The scarcity of water during the dry season rendered it impossible to run but a portion of the stamps of the mill connected with the mine, but as that impediment no longer exists, the entire battery will be kept in motion in the future. Splendid ore is being taken from the Calaveras Mine, located near the Woods. A new shaft is being sunk, which has reached a depth of about 175 feet. The old shaft is 400 feet deep. The ledge is a very wide one, all good-milling ore. A fine 20-stamp mill is owned in connection with the mine. Work is being energetically pushed with good results. This company are successfully using the Paul process, described under the heading of Butte County."

To Mr. J. Rathgeb, of San Andreas, I am indebted for the following statement of mining-operations in his vicinity:

"SAN ANDREAS, *October 20, 1875.*

"The owners of the two principal water-ditches supplying water to this vicinity have opened hydraulic claims, and are using nearly all of the water themselves, which fact causes interruption of work of many claims formerly worked, and also this year's exceptional scarcity of water, in a district that has scant facilities and short seasons for water-supply, causes a deficiency of information from mining-enterprises from this vicinity.

"Messrs. Wyllie & Treat have opened their hydraulic-mining claim near Cave City, using the water of the Table Mountain Ditch, which they own, and Terwilliger & Co. are using the water of the San Antonio Ditch on their hydraulic claims on Tunnel Ridge. Drift-mining on hydraulic claims is taking the place of hydraulic washing in many places for those reasons, and large piles of wash-dirt are accumulated to be washed in the winter. Lloyd Brothers, owners of the Garnet claim at San Andreas, have been running a bed-rock tunnel through the rim-rock, and have found the channel with good pay, and are about moving their arrastras for disintegrating gravel-cement to the new location. These

arrastras are worked by water-power, and are efficacious for grinding off the cement from the quartz pebbles without crushing them, liberating the gold contained in the cement, consisting of clay, quartz-sand, and oxide of iron. They have given better satisfaction to the owners than their 5-stamp mill, erected to crush the cement. Small-size garnets are found, also pieces of magnesium, in this claim. At Central Hill the drift-mining claims have been steadily worked with varied success. The Machiavelli, Clary, Benson, Cole, Dyas, Harkins, and Shears are locations on the Dead River channel; the pay-streak is drifted out, hoisted by horse-power to the surface, dried, exposed to the influence of the atmosphere, and washed.

"Quartz-mining on the Mother lode, which runs through this district in this county, is limited, from the fact that the capital has not aided it; private labor and the yield of the mines have developed them; its growth and development have been slow, but progressing. The Pioneer Chief, B. K. Thorn, owner, was developed to the depth of 260 feet; the Union Mine was sunk to the depth of 175 feet, with two levels 150 feet in length, and has a 10-stamp quartz-mill. Captain Thorpe's Mine has several shafts with levels, and a 5-stamp quartz-mill. Beckman's, Illish's, and Rathgeb's are worked with good results. Many other locations are lying idle for want of capital."

AMADOR COUNTY.

This county has long ranked as second in the State as a quartz-mining county. It has two systems of ledges traversing it from north to south, one at or near the point of contact of greenstone and slate, known as the Mother lode, the other higher up, in the granite formation. The latter has not been actively worked for several years, and it is doubtful whether upon the whole its mines have proved remunerative. Prior to 1870 there were twelve mills on this belt, aggregating 135 stamps, and twenty-four mills on the Mother lode, aggregating 422 stamps, making a total of thirty-six mills and 547 stamps; but it is not probable that more than two-thirds of these were running at any time. At the present time, according to the returns of the county assessor, there are but seventeen mills in the county, but as many of these are large mills, the number of stamps has not been correspondingly diminished.

The following table, compiled from the official returns of the surveyor-general, will show the relative condition of mining since 1870:

Year.	Quartz-mills.	Tons crushed.	Mining-ditches.	Length in miles.	Miners' inches of water used per day.
1870	29	69,940	35	427	5,575
1871	27	70,360	32	405	5,450
1872	24	252,000	.....	470	5,180
1873	15	61,000	.....	.....	12,000
1874	15	83,450	11	296	15,830
1875	17	85,780	11	340	15,830

The quartz-crushing of 1872, as given above, is either the result of error or of some very wild "guessing." The number of tons crushed was probably between 80,000 and 90,000. The great discrepancies in the returns of mining-ditches is the result of the consolidation of many of the smaller ditches into the Amador Canal, which now controls the principal water-sources of the county, and the abandonment of many surface-placers which were worked up to the year 1870.

West of the Mother lode there occurs a belt of copper-veins, the same as that worked several years since at Copperopolis, in Calaveras County. Only one mine of this class is now worked. This is the Newton Copper Mine, owned by John M. Glidden & Co., of Boston, Mass. The length of location is 1,300 feet; the course north 25 degrees west; dip 68 degrees east; length of pay-zone, 500 feet, with an average width of 2 feet. The vein occurs in metamorphic slate, and the ore is a sulphuret of the class known at Copperopolis as "bronze-ore." Four levels have been opened, and the ground explored to a depth of 400 feet and a horizontal distance on the vein of 588 feet. The mine is provided with powerful hoisting-works, and the ores are treated by the leaching-process. This property has been actively worked for several years, and with presumed profit to the owners; but as they reside in the Eastern States, no details of their operation can be obtained on the ground.

The Amador Canal, which is one of the most extensive water projects in the State, has been described at some length in my reports of 1874 and 1875. This great work was completed in 1875, and is now selling water as power to the quartz-mills on its line. The company already supplies nine mills, having an aggregate of 320 stamps, with a crushing-capacity of about 450 tons per day. Water is sold by the inch, the quantity used depending on the available fall. The Keystone Mill, with a 40-stamp mill, uses 180 inches for milling and hoisting purposes, while the Oneida, with 60 stamps, uses the same quantity. The principal ditch of the Amador Canal Company has a length of forty-five miles, exclusive of the branch ditches. Water is taken from a series of lakes in the high sierra, where it is retained for use in the dry season by the construction of dams. The largest of these lakes has an area of 640 acres, and its capacity has been increased during the past year to an additional depth of twelve feet by the construction of a dam at the outlet. There are two belts of auriferous gravel traversing this county, both of which will be extensively worked during the year 1876. Water is sold at 10 to 12½ cents per inch to hydraulic miners. The quartz-mills, taking small quantities, pay from 20 to 25 cents per inch.

There are about 100,000 linear feet of locations on the Mother lode between the Mokelumne and Cosumnes Rivers, which form the southern and northern boundaries of Amador County. Many of these are parallel locations; one line of locations on the hanging-wall, and another in the slates forming the foot-wall, or west country. In some cases, as at the Keystone, Consolidated Amador, and Oneida, both lines are owned by one company. The vein-system of the Mother lode varies in width, sometimes expanding to half a mile, and again presenting the features of a true fissure. Where these expansions occur the veins are always broken and of low grade.

I append, in the form of a tabulated statement, a review of the condition of quartz-mining on the Mother lode in this county, embracing a linear extent of 94,925 feet of ground. We may safely estimate the total length of locations at 100,000 feet, and of this great extent of ground it will be perceived by reference to the statement that but one-tenth, or about 10,000 feet, is now energetically worked with hoisting-works and mills. About 10,000 feet is worked irregularly, by means of arrastras or custom-mills.

The Hardenbergh Mine is located at Middle Bar, on the Mokelumne River, three miles from Jackson. It was opened in 1851 and worked successively by several owners, with reported profit, a large amount of pay-rock being extracted, of the yield of which no record is accessible

to me. In 1871 it was closed on account of the financial embarrassment of one of its proprietors. The present shaft (now 506 feet deep) was then under way. In 1875 the mine was re-opened by Mr. J. R. Hardenbergh. The location is 2,400 feet long. The property includes a 20-stamp mill, with rock breakers, pans, &c., run by water-power. A ditch brings 2,000 miners' inches of water from a point on the Mokelumne three miles above the mill. The fall is 27 feet, and the power is communicated through a turbine. Mine, ditch, and mill-site, with ground for surface purposes, amounting in all to 31 acres, are covered by a United States patent.

The Kennedy Mine, near Jackson, which was described in detail in the report for 1874, is being prospected on the 800-foot level. The mill has not run during the year, and therefore I have no returns. The large body of ore found in the southern portion of the company's ground, adjoining the Pioneer line, was of such low grade as to prove unprofitable in the company's mill, and prospecting was continued northward in the expectation of developing a chimney of high-grade rock which was worked in the upper levels.

The Consolidated Amador, of Sutter Creek, better known as the Hayward or Eureka Mine, ranked for many years as the leading quartz-mine of the State. During this period, from 1866 to 1872, the mine yielded quartz averaging \$20 per ton, and supplied a 40-stamp mill, earning large dividends for the owners. The history of this mine may be traced in the reports of Hon. J. Ross Browne and myself from 1868 to 1875. It appears that with increasing depth there occurred an impoverishment of vein-matter and a horizontal contraction of ore-chimneys. The lowest level opened in the mine was at a depth of 1,665 feet. The company are now sinking their main shaft to a depth of 2,000 feet, when the intervening ground will be exposed from the 2,000-foot level. Meantime the mine has in reserve a large amount of low-grade ore, which can be profitably worked by water-power, whereby the cost of milling is reduced to one dollar per ton.

The Oneida Mine, situated between the Kennedy and Consolidated Amador, two miles north of Jackson, was discovered in 1851, and has been worked since that time with varying results. Within the past two years, however, this property has been placed on a paying basis. The Oneida Company's mill started in March, 1875, on rock from a new level, (the 1,000-foot,) which has been opened through a new three-compartment shaft with a powerful set of hoisting-works erected during the previous fall and winter. The shaft is sunk nearly the entire distance through the country-rock, which relieves it from the pressure so detrimental to shafts sunk in the vein-matter of the Mother lode. The 1,000-foot level is now well open, and sinking of the shaft for another level is under way. (See tabular returns.)

The Lincoln Mine, of Sutter Creek, is owned abroad, and its agents decline to make a statement; but it is known to be in a prosperous condition, and now ranks among the leading producing mines of Amador County. The shaft is down 750 feet, and the mill crushes 80 tons per day.

The original Amador is the oldest quartz-mining location in the county, and one of the earliest in the State. The ledge was discovered at a point where it was denuded by Amador Creek, and its location was the nucleus of a group of mines which for many years yielded large profits to the owners. Those on the south bank of Amador Creek have been consolidated under the name of the Keystone Company. The yield of

quartz from the Original Amador was for many years about \$10 per ton, but recently a body of high-grade ore has been struck, which promises to be remunerative to the owners. This mine was fully described by Mr. James D. Hague in my report for 1873. Since that time its prospects have materially improved by the discovery of new ore-bodies of high grade. Mr. Hague found the cost of mining (including necessary dead-work in developing new ground) to be \$6.13 per ton, and the cost of milling, (steam-power,) \$2.25. The recent completion of the Amador Canal, affording the company ample water-power for crushing, has reduced the cost of milling to \$1.75 per ton.

The Keystone Mine, of Amador City, has for several years held the position of the leading mine on the Mother-lode belt, by reason of its great production, the magnitude of its operations, and the economy of its management. Since 1870 its production has averaged \$1,000 for each working-day. The Keystone is a consolidation of three parallel claims—the original Keystone, the Geneva, and the Spring Hill. The total length of location is 1,800 feet horizontally from north to south, but the company owns 3,100 feet by virtue of the purchase of the parallel ledges. The east country is greenstone, and the west a black, talcose slate. Three veins occur in the company's ground—one on the greenstone hanging-wall, and the other two in the west country-slate, which can scarcely be called a foot-wall, as there seems to be no distinct line of demarkation of the quartz-veins in this direction, they being in fact blended with the talcose slate in a very irregular manner with respect to dip and width, but preserving a uniform course of northwest and southeast. The ore-bodies in the slate, which form the principal source of the company's revenue, are of variable extent, sometimes expanding to a width of twenty feet and again contracting to a mere seam. It has been noticed that the expansion generally occurs when the vein "flattens," and contracts where it approaches a vertical dip. In consequence of this marked peculiarity in the west veins, the ground is prospected by vertical winzes which answer the purpose of horizontal cross-cuts in more regular veins. By this means, the result of long experience and close observation of the peculiarities of the vein-system, the mine always presents large bodies of reserves which would almost invariably have remained undiscovered by the usual system of prospecting by horizontal drifts and cross-cuts. In several instances levels would have passed through nearly barren ground, leaving large ore-bodies between them. The Keystone has been explored to a depth of 750 feet and a length of 900 feet. The longest cross-cut is about 300 feet, cutting the three veins at right angles. On the east is found a well-defined hanging-wall of greenstone, carrying with it a vein of low-grade quartz.

There is properly no foot-wall, but a well-marked line of fracture is found, presenting the peculiar feature known as "slickensides," about 300 feet west of the greenstone. Beyond this exploration has failed to disclose bodies of quartz, although a cross-cut has been run 120 feet beyond the line of fracture. The yield of the quartz in this mine varies from \$10 to \$20 per ton. The average for the year 1875 was nearly \$17, but I learn it run somewhat higher toward the close of the year. There are two working-shafts, and a third is sinking. The hoisting is done by water-power. One hundred and eighty inches of water are used, at an expense of about \$10 per day, for both hoisting and crushing. The mine has now in reserves at least one year's supply of ore for its 40-stamp mill. The completion of the Amador Canal insures a constant supply of water for the future as a motive-power. This with the adop-

tion of self-feeders reduces the expenses of treatment of ores to about \$1 per ton, and affords a margin of profit on a class of ores hitherto considered as too low in grade for working.

Between Amador City and Plymouth we find about 15,000 feet of ground which has been worked only on the surface, the rock being crushed in custom-mills or arastras. The Bunker Hill and the Gover are the only claims working with machinery. Near Drytown two claims, the Gold Mountain and the Belding, are each running a 10-stamp mill. As these claims are not on the line of the Mother lode, they are not mentioned in the tabulated statement.

The Phoenix Mine, of Plymouth, was opened in 1859, and has been continuously worked since that time. There are two working-shafts, 200 feet apart, each having attained a depth of 900 feet. This mine presents a large body of low-grade quartz, which is extracted and milled at an expense of \$5.50 per ton. On the 800-foot level the ore-breasts are about 100 feet in width, with but little waste-rock, as the slates carry a large proportion of auriferous sulphurets. The works are run by water from the company's ditch, the power being supplied by a turbine wheel. By means of water-power and automatic feeders the minimum of economy has been reached in this mine, and quartz yielding \$10 per ton is worked with large profit to the owners.

Water-power, where there is sufficient fall, is utilized by turbine or "hurdy-gurdy" wheels, the latter class being effective with a small quantity of water where the nature of the ground admits of a fall of about 200 feet. One of these runs the 60-stamp mill of the Oneida Mining Company. It is of cast iron, 8 feet in diameter and 4 inches in width. On the periphery of the wheel are cup-shaped buckets, which receive the water from a three-inch nozzle. Against these buckets one hundred and eighty inches of water, with a fall of 230 feet, is projected by means of the nozzle. The wheel-box occupies a space of 12 feet in height by 4 feet in width.

Automatic ore-feeders are coming into general use, and have an important bearing on the economy of quartz-milling. The favorite one in Amador County is the invention of Mr. James Tulloch. It consists of a hopper mounted on a strong frame-work. Beneath this hopper is the tray which receives the ore from the hopper as fast as may be desired, a suitable regulating-gate being employed. The tray is inclined as much as may be desired, and is suspended by links from the frame, so that it can receive an oscillating motion forward and back. Beneath the tray a rock-shaft crosses the tray transversely, and an arm extends upward and is secured by a pin passing through the lugs in the bottom of the tray and through the slotted upper end of the arm. The end of the shaft has a crank formed upon it, and from this crank the rod connects with one end of a lever-arm. The lever is pivoted near its middle to the frame, and the other end extends to a point near the stamp stem. An adjustable collar is secured to the stem, and whenever the stamp falls, the collar will strike the end of the lever, and through the connecting-rod the rock-shaft will be operated so as to draw the tray back. When the stamp is again raised, the tray will be allowed to swing forward until the lugs on the bottom of the tray strike a bar or post, which will abruptly stop the tray, and thus tend to loosen and throw forward its contents, this feature being especially valuable when the ore is wet. In practice it is found that the force of gravitation is sufficient to operate these parts, no springs being used; a spring is placed upon the end of the lever which is struck by the collar, so as to relieve

the strain and transmit the force gradually. The adjustable bar serves to regulate the movements of the different parts, and the amount of ore beneath the stamps will regulate the amount fed.

Both the quartz and accompanying slates of the Mother lode contain sulphurets. The proportion is from 1 to 2 per cent., and the value when concentrated about \$100 per ton. Concentration is effected by means of Hendy's apparatus, supplemented by long lines of sluice-boxes. The concentrated sulphurets are sold to chlorinators.

The condition of quartz-mining in Amador County is exhibited in the following tables, compiled during the month of October, 1875:

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Exhibit of the condition of quartz-mining on the Mother lode in Amador County.

Name of mine.	Length of location.	Depth attained.	Position.	Mill.	Remarks.
<i>Feet.</i>	<i>Feet.</i>				
Marlette	800	300	East vein	None	Work discontinued; mill dismantled. Cause, low grade of rock.
Hardenberg	2,400	500	do	20 stamps	Work resumed in 1873, after four years' stoppage.
Hathaway			do	None	Not worked during past ten years. No record accessible.
Howard	2,310		do	do	Do.
Moore		350	do	do	Do.
Sutter	1,500	100	do	do	Do.
Zella, or Coney	1,800	600	do	do	Do.
Blue Jacket	500	150	do	do	Work discontinued; mill dismantled. Cause, refractory rock; sulphureous rich.
McKinney & Stewart	2,000	150	West vein	Arrastra	Work discontinued; mill dismantled. Cause, low grade of rock.
German Claims	1,000	100	do	do	Engaged in prospecting, with good results; several shafts.
Spanish Claims	2,000	150	do	do	Do.
Sylvester Ground	4,600	100	do	do	Do.
Burling	1,500	100	do	None	Desultory prospecting.
Bacon	1,500	100	East vein	do	Do.
Good Hope	2,000	100	do	Custom-mill	Rock crushed at custom-mill.
Trowbridge	1,200	100	West vein	None	Idle; situated in Jackson Basin; vein low grade and broken.
Adams	800	100	do	do	Do.
Roberts	2,200	100	East vein	do	On hill-side; abundance low-grade rock; not worked.
Pioneer	1,350	150	West vein	do	Prospecting low levels; no milling this year.
Kennedy	2,000	850	do	20 stamps	Actively prospecting; vein narrow and rich; rock worked at custom-mill.
Valunteer	1,060	150	East vein	None	Desultory prospecting; worked. See returns elsewhere.
Clyde	1,300	100	do	40 stamps	Actively and profitably worked. See returns elsewhere.
Onelda	2,000	1,000	Both veins	None	Not worked; no record accessible.
Tunnel Hill	2,118	100	do	do	Works discontinued; no pay-shoot found.
Summit	1,166	500	do	do	Deepest mine in California. Prospecting lower levels. See returns elsewhere.
Amador, Consolidated	1,850	2,000	Both veins	40 stamps	Do.
Maxwell	1,441	150	East vein	None	Work suspended; has yielded good rock.
Railroad	1,667	400	West vein	do	Paralleled to above; has yielded good rock.
Wildman	1,069	500	do	Custom-mill	Desultory working; past record good.
Mahoney	1,122	600	do	16 stamps	Do.
Lincoln	1,798	750	Both veins	20 stamps	Decline to make returns.
North Lincoln	1,100	100	do	None	Actively working, with good prospects.
Comet	750	150	do	do	Not worked; no record accessible.
North Star	1,113	400	do	do	Do.
Herbertville	1,781	800	do	do	One of the earliest locations in the State; not worked for many years.
Median	1,380	300	do	do	Not worked for many years; no record accessible.
El Dorado	1,300	750	Both veins	40 stamps	Three shafts actively and profitably worked. See returns elsewhere.
Keystone, (including Spring Hill)	2,100	100	West vein	None	Slightly explored; not working.
Eclipse	494	100	do	do	Do.
Golden State	360	100	do	do	Working actively; condition prosperous. See returns elsewhere.
Original Amador	1,436	600	East vein	40 stamps	Do.

* Estimated.

Hunter Mill.....	1,115	450	do	10 stamps	Work resumed this year; quartz low grade, but profitable.
Mayflower No. 1.....	1,500	100	do	None	Slightly explored; not working.
Leak Chascoe.....	1,500	300	West vein.	do	Do.
Nevada.....	1,700	100	do	do	Do.
Hasard.....	1,385	200	One ledge.	do	Has yielded good milling-rock; not working.
Fremont.....	1,600	100	do	do	Prospected at intervals; not working.
Goree.....	670	700	do	10 stamps	Work resumed this year; low-grade quartz.
Loyal.....	1,055	100	do	90 stamps	Mill idle; rock worked in arrears from surface-shafts on tribute.
Italian.....	305	100	do	None	Demolitory surface-workings; paid near surface.
Seaton, or Drytown.....	1,300	500	do	do	Ledge wide; low-grade rock. Not worked for ten years. Mill destroyed by fire.
Chili.....	1,300	do	do	do	Prospected on surface; not working.
Mayflower No. 2.....	1,300	do	do	do	Do.
Potosi.....	840	300	do	16 stamps	Mill idle; past record of mine good; not working.
Webster, Clay, Dry Creek, and Hercules.....	Aggregated 4,500	From 100 to 800	do	None	No active prospecting carried on for several years. Low-grade rock.
Phoenix.....	1,550	300	West vein.	40 stamps	Great width of vein; quartz low grade, but profitable. See returns elsewhere.
Alpine.....	800	400	do	10 stamps	Work suspended; results unprofitable; low-grade rock.
Enterprise.....	1,300	200	do	8 stamps	Do.
Bay State.....	1,500	100	do	None	Demolitory prospecting at intervals; no record.
Richmond.....	1,000	300	do	30 stamps	Work suspended for several years; low-grade rock.
Spanish, or McGottigan.....	1,300	400	do	None	Work resumed, with new bolting-works; prospects good.
Lady Bedford.....	1,000	300	do	do	Ledge narrow; rock pays \$20 per ton; working.
Total length of claims.....	94,945				

List of mills in Amador County, California; reported by W. A. Skidmore.

District.	Name of mill.	Owners.	Kind of power and amount.	Number of stamps.	Weight of stamps.	Number of drops per minute.	Height of drop.	Number of pans.	Number of concentrators.	Cost of mill.	Capacity per 24 hours, in tons.	Cost of treatment per ton.	Tons crushed during year.	Method of treating sulphurets.
Sutter Creek...	Oneida.....	Oneida Mining Com- pany.	Steam and water...	60	Lbs. 600	80	9 Inches.	2	2	\$60,000	100	\$1 25	.....	Buddles and con- centrators.
Do.....	Consolidated Amador.....	Consolidated Amador Mining Company.	do.....	40	700	80	9	2	None.	60,000	80	\$1 00 to 1 50	.....	Chlorination.
Amador.....	Original Amador.....	London and California Mining Company.	do.....	40	700	80	8 to 10	1	3	55,000	80	1 50 to 1 75	.....	Roasting and pans.
Do.....	Bunker Hill.....	Bunker Hill Mining Company.	Water, 70 inches, 575 feet fall.	10	750	80	9	12	None.	8,000	16	1 00 to 1 25	.....	Pans.
Do.....	Keystone Consolidated.....	Keystone Mining Com- pany.	Water, 96 horse- power.	40	750	86	8	.....	22	60,000	90	1 21	25,579	Chlorination.
Plymouth.....	Phoenix Consolidated.....	Phoenix Gold-Mining Company.	Water, (turbine)...	40	600	84	7	None.	None.	35,000	65	1 00	16,000	Do.
Drytown.....	Gover.....	Gover Mining and Mill- ing Company.	Water, 100 inches, 64 feet fall.	10	600	80	9	None.	5	7,000	15	1 00 to 1 25	.....	Do.

List of mines in Amador County, California; reported by W. A. Skidmore.

District	Name of mine.	Owners	Number of miners employed.	Miners' wages, per day.	Cost of sinking, per foot.	Cost of drifting, per foot.	Cost of stoping, per ton.	Cost of mining, per ton.	Cost of milling, per ton.	Company or custom mill.	Number of tons extracted and worked.	Average yield per ton.	Percentage of sulphur.	Total bullion-product.
Sutter Creek.	Onida.....	Onida Mining Company.	60	\$2 50 to \$3	Varies largely.	.....	.....	\$6 00	\$1 25	Company	70 per day	\$12 00	.....	.....
Do.....	Consolidated Amador.	Consolidated Amador Mining Company.	50	2 50 to 3	\$20	\$8	\$12 00	5 00	\$1 00 to 1 50	do	.....	10 00	1	.....
Amador	Original Amador.	London and California Mining Company.	34	3	35	15	3 00	5 00	1 50 to 1 75	do	.....	28 00	2	.....
Do.....	Bunker Hill	Bunker Hill Mining and Milling Company.	8	2 50 to 3	15	6	2 00	5 00	1 00 to 1 25	do	.....	18 00	1½	.....
Do.....	Keystone Consolida- ted.	Keystone Mining Com- pany.	100	2 50 to 3	\$7, \$15, 30	\$6 to 7	.....	4 89	1 21	do	25, 570	16 90	2	\$432, 637
Plymouth.....	Phoenix Gold.....	Phoenix Gold-Mining Company.	90	2 50 to 3	13	9 to 10	1 90	4 50	1 00	do	65 per day	6 00	1½	.....

List of mines in Amador County, California; reported by W. A. Silliman.

District.	Name of mine.	Owners.	Length of location.	Course.	Dip.	Length of pay- zone.	Average width.	Country-rock.	Character of vein-matter.	Cost of hoisting and pump- ing machinery.	Greatest depth attained.	Greatest length of hori- zontal exploration.	Number of levels opened.
Sutter Creek...	Oncida.....	Oncida Mining Com- pany.	Feet. 3,000	N. & S.	65° E..	Feet. 500	Feet. 6	Greenstone and slate.	Blackstone and quartz.	\$50,000	Feet. 1,000	Feet. 700	3
Do.....	Consolidated Amador.	Consolidated Amador Mining Company.	3,291	N.W. & S.E.	70° E..	600	3 to 30	do	Gold-bearing quartz.	50,000	3,000	1,300	10
Amador	Original Amador.....	London and California Mining Company.	1,350	N.W.	N.E.	250	8	do	do	12,000	550	1,300	8
Do.....	Bunker Hill	Bunker Hill Mining Company.	1,400	N.W. & S.E.	65° E..	150	2 to 16	do	do	2,000	450	270	3
Do.....	Keystone Consolidated	Keystone Mining Com- pany.	1,800	W. & S.	45° E..	400	.....	do	Quartz and slate.	40,000	740	900	6
Plymouth.....	Phoenix.....	Phoenix Gold-Mining Company.	1,000	23° W. of N.	70° E..	W. 250	30	do	Gold-bearing quartz.	15,000	900	400	8
Drytown	Gover	Gover Mining Com- pany.	579	N.W. & S.E.	65° E..	.....	.....	do	do	3,000	700	800	3

EL DORADO COUNTY.

The following table indicates the condition of mining in this county during the past five years:

Year.	Quartz-mills.	Tons crushed.	Mining-ditches.	Length in miles.	Miners' inches of water used per day.
1870	32	3, 730	53	853	5, 365
1871	44	21, 645	58	966	9, 450
1872	40	No returns..	54	850	8, 730
1873	40	do	54	850	8, 730
1874	30	do	50	900	.....
1875	27	do	50	900	7, 500

During 1875 but three mills were engaged in crushing, while the assessor's returns showed that there are 27 quartz-mills in the county, equivalent to a total crushing-capacity of 500 tons per day.

Many of the idle mills are among the most expensive erected in the State; three of the number cost from \$40,000 to \$60,000 each. The aggregate cost of the mills now standing idle is not less than \$250,000. The falling off in this branch of mining is attributable to the impoverishment of the quartz in depth. Several of the mines formerly noted for their production of free-gold, such as the Cederberg, have suspended operations, this class of ore running out at a depth of about two hundred and fifty feet, and the quartz below that level being of too low grade for profitable working. The belt of auriferous rocks in this county is nearly thirty miles in width, and contains several systems of quartz-veins, among others the so-called Mother lode, but the formation is much broken and the ore of low grade. The geological features of this county were fully described by Mr. Amos Bowman in my report for 1875. Since that time there has been no important change in the condition of the mining-interest.

An important claim not heretofore noticed is the Dry Gulch or Crawford Gravel claim, situated near Pleasant Valley. It was discovered in the early days by following up the several rich gulches that head from it, and was covered by innumerable square locations of the early miners, which were afterward consolidated under a United States patent. It forms a depression or "sag" in the main ridge between Clear and Sly Park Creeks, and embraces 160 acres of land, of which from 90 to 120 are estimated to be deep, rich gravel-channel. The depth varies from 60 to 260 feet, the average being about 110 feet. It has been prospected by eleven shafts, sunk for drifting purposes. The deepest is 128 feet, and did not reach bed-rock. In the early days it was drifted by several tunnels, the largest being about 700 feet. The character of material in shafts and tunnels is quite uniform. By drifting it yielded over \$10 per ordinary car-load, the gold being coarse and selling readily at stores for \$18.70 per ounce. It has all the characteristics of an ancient channel, and is plainly traceable, in the form of a letter S, from the southeast to the northwest corner.

It is finely located for extensive hydraulic working, and possesses two unrivaled outlets. The Clear Creek or northwest outlet permits a sluice-line of $\frac{1}{2}$ mile, of any grade desirable, and an eight-inch sluice-grade

would give it a 140 feet drop into Clear Creek, which falls on an average eighteen inches per rod. No bedrock-tunnel is necessary, since the rim-rock is low, so that only a short rockcut is required. As determined by the prospect-shafts, the channel falls toward this end on a steep grade.

The Park Creek or southeast outlet possesses a magnificent fall of over 450 feet. This end has been altogether worked by the hydraulic system, and probably two acres have been washed off. The company is extending and straightening the bed-rock tunnel, so that it will be 5 by 6 feet in the clear and 240 feet in length, and will "bottom" all the land on this end of the claim. It has a grade of 8-inch fall to each 12 feet.

Previous to 1874 a small head of surface-water and a hand-nozzle were employed. By this crude apparatus nearly 10,000 cubic yards of earth were removed in two seasons, and produced \$8,770. Last year a new 400-inch (4-inch pressure) ditch was completed, but owing to the scarcity of water, on account of the slight rain and snow-fall, not over 150 inches were available for about four hours of thirty days. During this time 2,005 cubic yards were washed, and yielded \$3,140.

This year the claim is being put in good shape for extensive working, which was impossible last year by reason of the season of the year (December) when it was acquired by the present proprietors. A line 500 feet long of 36 by 30 inch sluices is being placed in the tunnel and beyond, when the *débris* is thrown into a rocky ravine and allowed to tumble among the rocks for a distance of 300 feet, when it is again caught up, the bowlders precipitated over a "grizzly" into the cañon below, and the disintegrated gravel permitted to deposit its gold in a 600-foot flume, after which the tailings escape. One more Giant will be added to the two already in use. Next year it is contemplated to work the northwest end. The present face of the gravel on the southeast end is 68 feet in height, and is but a short distance from the southern boundary of the ancient channel. The bed-rock dips rapidly to the north, so that in a distance of 215 feet the depth of gravel is 85 feet. The first or top stratum of gravel (10 to 30 feet) is of a yellow and reddish cast, and seems to be equally rich as the substrata or "blue gravel." Here and there are short, unconnected streaks of a white clay, that yields readily to the pipe. The bowlders, composed of quartz, "nigger heads," and micaceous schists, are not large, but very irregular in form, and show but little wear from attrition. Bank-blasting is practiced. The gravel washes easily, but runs rather sluggishly; hence a heavy grade is necessary. The "backing" of the black sand is thereby also avoided.

On the northwest end about one-half acre was washed away by parties on a lease, but I have been afforded no means of ascertaining its yield. It is regarded as the richest portion of the mine.

The hydrostatic pressure at the southeast works is 176 feet, and on the northwest end 240 feet. A reservoir of a capacity of 600 inches for 10 hours is on the claim. The water is delivered to the machines through a 15-inch pipe and an 11-inch pipe.

Park Creek is capable of supplying 4,000 inches of water for five months of the year, and yields over 1,000 inches for 7 months. The above-mentioned 400-inch ditch has been enlarged this fall to 2,200 inches capacity, at a cost of \$13,000. It is $5\frac{1}{2}$ miles in length, and has been cut mostly through blasting-ground.

The Eureka Water Company's ditches and water-rights to the waters of North Fork of the Cosumnes, Steeley's Fork, Van Horn Creek, Baltic

Creek, Camp Creek, Stonebreaker's Creek, and Park Creek have been purchased of D. O. Mills & Co. These ditches aggregate 276 miles of main and distributing lines, and supply all that region between the American River and its North Fork and the Cosumnes, and from the higher foot-hills to within 15 miles of Sacramento City. They were constructed at an early date, at a cost of \$3,400,000, and they are too low for the great amount of deep gravel east and west of Pleasant Valley. These ditches have been consolidated with the Crawford Gravel claim, and work on the new high line has already been commenced. The Park Creek branch will be increased from 2,200 to 4,000 inches capacity, and the Camp Creek line will be completed early in the spring, while the North Fork line will be finished in September, 1876. These will have a capacity of 4,000 inches, and a length of 21 miles. These improvements, together with the contemplated reservoirs, will cost about \$160,000.

During the year 1874 cinnabar was discovered in this county in the second range of foot-hills north of the Cosumnes River, and about 800 or 900 feet above sea-level. The vein lies between serpentine on the west, forming the foot-wall, and slate on the east. The vein-matter is composed of sandstone and quartz. The vein or ledge stands nearly vertical, and has been cross-cut 80 feet. The ore is diffused throughout the mass in irregular quantities, some strata being exceedingly rich. At the present point of development, about 80 feet vertical, a high grade of ore has been cross-cut, which occurs in alternate bands of sulphurets of iron and cinnabar-bearing quartz. This ore ranges in grade from 10 per cent. upward. The gangue-matter is, however, principally sandstone. A bench of three retorts was erected in 1875, but the predominance of iron-sulphurets in the ore rendered some other method of treatment advisable, and work was suspended.

Mining-statistics of El Dorado County, California; reported by W. T. Gibbs and William Teague.

DESCRIPTION OF LEADING MINES.

Name.	District.	Owners.	Length of location.	Course.	Dip.
Woodside	Georgetown	Company	Feet. 1,500	N. W. & S. E.	65° E.
Taylor	do	do	3,000	do	75° E.
Mount Pleasant	Mountain	O. D. Lambard.	5,220	N. 16° E.	80° E.

Name.	Length pay-zone.	Average width.	Country-rock.	Vein-matter.	Cost of hoisting and pumping machinery.	Greatest depth attained.	Greatest length horizontal exploration.	Number of levels opened.
Woodside	Feet. 100	Feet. 3	Talcoes slate	Auriferous quartz	\$10,000	Feet. 300	Feet. 150	2
Taylor	250	3	Slate	do	1,000	400	300	2
Mount Pleasant	500	3	Granite	do	* Tunnel	300	350	2

* Length, 500 feet; cost, \$1,500.

Mining-statistics of El Dorado County, California—Continued.

OPERATIONS OF LEADING MINES.

Name.	Number of miners employed.	Wages, per day.	Cost sinking, per foot.	Cost drifting, per foot.	Cost sloping, per foot.	Cost mining, per ton extracted.	Cost milling, per ton.	Company or owner mill.	Number of tons extracted and worked.	Average yield per ton.	Percentage of sulphurets.	Total bullion-product, 1875.
Woodside	20	\$3	\$30	\$10	\$4	\$6	\$2	Company ..	1,500	\$35	12	\$35,000
Taylor	25	3	30	12 1/2	2 1/2	5	2 1/2	do	5,000	\$7 to 18	14	50,000
Mount Pleasant	2	3	6	4	2	\$3 to 5	2 1/2	do	700	47	1 1/2	31,000

STATEMENT OF QUARTZ-MILLS.

Name.	Kind and amount of power.	Stamps.				Number of pans.	Number of concentrators.	Cost of mill.	Capacity per 24 hours—tons.	Cost of treatment, per ton.	Tons crushed during the year.	Method of treating sulphurets.
		Number.	Weight, lbs.	Drop, inches.	Drops per minute.							
Woodside.....	Steam, 40 h. p.	5	650	7	84	1	None	\$5,000	7	\$3 00	1,000	Pan-grinding.
Taylor.....	Steam, 35 h. p.	10	700	7	80	.....	.....	20,000	15	2 00	5,000	Do.
Mount Pleasant	Water, 30 miner's inches.	10	750	7	80	.....	.....	5,000	12	2 50	.....	None.

PLACER COUNTY.

Next to Nevada County this is the most important hydraulic-mining county in the State. Its physical characteristics and the nature of its mines, both quartz and gravel, have been amply described in former reports. The principal quartz-mining districts are in the vicinity of Auburn, in the foot-hills bordering on the Sacramento Valley. The formation here is granite and slate. A tabulated description of the developed mines will be found in my Report of 1874, pp. 98, 99. Since that time no new mines of any importance have been discovered, and with one exception, the St. Patrick, but little progress has been made in development. The official returns of the county assessors for the past five years contain so many evident inaccuracies that I have refrained from tabulating them.

The St. Patrick Company, near Ophir, owning four ledges and a 15-stamp mill, has made a remarkable development during the past year in its Crater Mine. Large bodies of ore were discovered between the 200 and 300 foot levels, and the mill is driven to its full capacity on rock yielding an average of \$30 per ton, giving a daily gross product of from \$900 to \$1,000. There are over twelve months' reserves or backs of this class of ore in the mine. The company presents the following statement of operations for the year ending October 30, 1875:

Receipts.

From bullion	\$73,951 66
From assessment	19,920 00
From milling-ores, &c	495 00
Balance on hand October 30, 1874	731 41
Total	95,098 07

Expenditures.

Mine and mill labor and supplies at mine.....	\$68,036 03
Mine and mill supplies, San Francisco office.....	12,262 89
Contingent expenses.....	2,403 81
Cash in bank.....	12,395 34
Total	95,098 07

The superintendent says:

The 212-foot level, No. 2 shaft, is in east of shaft 268 feet; ledge in drift, 2 feet wide; on stope, 2 to 2½ feet wide. The rock shows well in sulphurets of a good quality, and has the appearance of good milling-rock. The 312-foot level, No. 1 shaft, is in east of shaft 413 feet; ledge in drift, 2½ feet wide; on stope, 2 to 2½ feet. The rock looks good, both in drift and on stope. The rock in drift I think is the best in the mine. It shows well in sulphurets, and some gold. I think we are coming to a fine body of rock going east. It is the same worked last winter on the 150-foot level, No. 2 shaft. The 440-foot level, No. 1 shaft, is in east of shaft 226 feet; ledge in drift, 20 inches wide; on stope, 20 inches to 2 feet. The rock continues to look good, shows plenty of galena and sulphurets, and some gold.

The \$19,920 raised by assessment during the past year was expended in the erection of powerful hoisting-works and in deep explorations of the mine.

The Saint Lawrence Mine is situated in Ophir mining-district, one mile and a half from Newcastle Station, on the Central Pacific Railroad, and comprises 1,000 feet on the Saint Lawrence ledge or lode, 800 feet of the mining-ground known as the Mammoth or Boulder, neither of which are being worked at this date; and 2,500 feet of mining-ground known as the Hathaway-Swift, upon which a shaft has been sunk to the depth of about 150 feet, and two levels run from the outside, intersecting the shaft, each of which is about 400 feet long. Five shoots of pay-ore have been cut in running these levels, each of which is over 75 feet in length on the vein. The ledge has well-defined walls, and the pay-ore in the shoots averages over 2 feet in width. The ores raised assay high in gold-value, but are found rebellious in working by ordinary gold-milling process. This company has a well-built water-mill of 12 stamps, with the necessary appliances, Hendy concentrators, reverberatory-furnace, and grinding-pans, and capable of milling 18 tons of ore per day.

The Julian Mine, near Newcastle, also in the foot-hills, has been in a prosperous condition, but no returns have been received. The rock is of low grade, yielding from \$8 to \$12 per ton, but the pay is uniform and the ledge of fair width. With the exception of the three claims above mentioned, but little has been done in quartz-mining in the vicinity of Auburn.

The following are the returns furnished by J. H. Neff, superintendent of the Rising Sun Mine, near Colfax, in Illinoistown district, owned by Coleman, Neff & Co.:

Length of claim, 3,000 feet; course, east and west; dip, south; length of pay-zone, 800 feet; average width, 15 inches; country-rock, greenstone; vein-matter, quartz; cost of pumping and hoisting machinery, \$4,000; greatest depth attained, 520 feet; greatest horizontal exploration, 1,000 feet; 6 levels opened; 28 miners employed, (1875,) wages, \$3; cost of sinking, per foot, \$28; of drifting, \$12; of mining, per ton, \$9; of milling, in company's mill, \$3; number of tons extracted and worked in 1875, 4,880; average yield per ton, \$21.50; sulphurets, 5 per cent.; total bullion produced, \$104,920; steam-mill, 60 horse-power; 10 stamps of 900 pounds, dropping 14 inches 60

times per minute; 5 pans; cost of mill, \$20,000; capacity, 20 tons per 24 hours; tons crushed in 1875, 4,880.

The mining prospects around Gold Run and Dutch Flat were never brighter. The Miners' Ditch Company commenced washing through its new bed-rock tunnel on December 15, and is now running night and day, using 900 inches of water.

The Gold Run Hydraulic Mining Company is about ready to commence washing. The gravel at the shaft is 180 feet deep. The tunnel is 950 feet in length, and has a 5-foot flume, with two under-currents and three 2-foot dumps. The tunnel empties into the Miners' Ditch Company, 700 feet from the main tunnel, and 1,200 feet from its mouth in Cañon Creek. The company will open through an incline, 250 feet through gravel and 80 feet through bed-rock. The dirt on the bed-rock is very rich, having prospected from \$5 to \$10 to the pan in places.

A description of the ground of the Indiana Hill Cement Mill and Mining Company, near Gold Run, with statistics of the yield of this mine and others of its class, will be found in the report of 1875. The following record of the present year is given by Mr. J. N. Jensen, the secretary of the company :

Work was commenced on November 8, 1874, and the first run of one thousand car-loads was made December 1. The following is the record from that time :

No. of run.	Date.	Quantity.	Value.
1	December 1, 1874.....	1,000 car-loads	\$3,065 72
2	December 27, 1874.....	1,048 car-loads	3,370 13
3	January 25, 1875	1,000 car-loads	3,622 97
4	February 19, 1875.....	1,000 car-loads	4,028 28
5	March 15, 1875.....	1,000 car-loads	5,125 50
6	April 5, 1875.....	1,000 car-loads	6,134 72
7	April 26, 1875.....	1,081 car-loads	6,354 67
8	May 22, 1875.....	1,081 car-loads	8,279 66
9	June 19, 1875.....	1,440 car-loads	6,184 08
10	July 17, 1875.....	1,160 car-loads	5,867 60
11	August 21, 1875.....	1,400 car-loads	4,403 14
		11,210 car-loads.	56,446 47

The gross amount of expenses for extraction and milling, including material of all sorts, such as powder, fuse, candles, timber, coal, &c., was \$24,000, or a fraction over \$2 per car-load, leaving a profit of \$32,446.47. The amount of ground moved has been 201 feet in length, average width 90 feet, and from 7 to 8 feet in height. Our work for the past season has been close to the west rim of the channel, where the bed-rock was found about 15 feet higher than the average level of the bed-rock in the main channel, and running at that height in a long flat bench or bar. It is green slate and very soft, the gravel also becoming somewhat softer than it is nearer the mouth of the channel. Work was stopped on the 11th of August last, for lack of water and for such repair as was necessary. The company commenced crushing again on the 17th of November, 1875.

The car-load above referred to contains about 20 cubic feet. The cement is run through an 8-stamp mill, with a crushing-capacity of about 40 loads per day.

Cañon Creek, which heads about ten miles northeast of Gold Run, flows down a steep cañon just to the east of the Gold Run gravel dis-

trict, and is the natural outlet for its mines. Col. Jonathan Moody and W. H. Kinder own about two miles each of this cañon. They are both valuable tailing-claims. Colonel Moody has two 8-foot flumes, side by side, 8 feet deep, and three-fourths of a mile long, and four under-currents, from three of which he has taken this season, in three weeks' time, the sum of \$1,200. His claim has averaged a yield of \$14,000 per year for the last eight years. The Kinder claim is provided with eight under-currents, and does equally well, if not better. The Cañon Creek claim and the system of gold-saving in this class of ground are fully described in my report of 1875.

Attention has recently been attracted to a section of mining-country situated in the southern portion of Placer County, near the line of El Dorado County, lying between the North and South branches of the Middle Fork of the American River, (locally known as *Long Cañon Divide*.) but until the last two years very little work has been done, on account of the absence of mining-ditches. The gravel-deposits of this section are very extensive, commencing at Pennsylvania Point—the lower end of the district—and extending up the ridge a distance of 25 miles. At Pennsylvania Point, forming the apex of the ridge, the gravel-deposits are from 20 to 40 feet in depth. Three miles above, at Pennsylvania Flat, the deposits are from 200 to 300 feet in depth. Masses of auriferous-gravel deposit of unknown extent, and belonging to the same channel-system, are exposed at Lynchburgh and Blacksmith Flat. This region has an elevation of from 3,000 to 4,000 feet above sea-level, and the channel here exposed is probably the head of one of the ancient tributaries of the great Pliocene river-system of California. The bed of rock of the higher portion is granite, and of the lower, slates. This auriferous belt is situated higher than the lava-flow.

The country between the Middle and North Forks of the American River contains vast deposits of auriferous gravel of great richness. At Bath during the past season the Paragon Company, using 400 inches of water, took out \$30,000 in 30 days. Wheeler & Breeze took out a large amount of gold during the season—their ground having yielded by the hydraulic process at the rate of from \$70,000 to \$100,000 per acre. The adjoining claim of Rousch & Grinnell is also noted for its large yield. The completion of several ditches on this divide and the consolidation of mining-ground promise a much larger bullion-product for the future.

Dutch Flat and Gold Run districts.—Mr. C. J. Brown, of Dutch Flat, has kindly contributed the following comprehensive review of the condition of gravel and hydraulic mining in these districts.

I will confine myself to a section from Indiana Hill on the south to Thompson's Hill on the north, and its tributary, known as the Dutch Flat Channel, from the latter place eastward one mile, in all, six linear miles of these two channels of ancient rivers long since extinct. Twenty years ago they were filled and overspread with auriferous gravel to the depth of from 350 to 500 feet, upon which grew a forest of gigantic pines.

It will be observed that I locate this section of mining-lands on the divide between the North Fork of the American River and Bear River, in Placer County, and that the Central Pacific Railroad crosses it between Gold Run and Dutch Flat at an altitude of 3,420 feet above the sea.

As the ancient channel ran its waters toward the north, Indiana Hill (which is one mile southeast of Gold Run) is located on the inlet, and Thompson's Hill (one mile west of Dutch Flat) on the outlet of its old channel across the divide. I use the words inlet and outlet, because to the south of Indiana Hill the North Fork of the American River has crossed the ancient channel and cut a cañon to a perpendicular depth of 1,500 feet below the old channel, completely obliterating all evidence of its former existence between the latter place and Iowa Hill, a distance of four or five miles, and to the north of Thompson's Hill Bear River crossed it in like manner, and cut a cañon to a perpendicular depth of 1,000 feet below its channel, destroying about two miles of it. This hill was extensively worked as drift-ground by the Yankee, Potosi, Why Not,

Badger, and Ohio Companies from 1856 to 1863, and proved immensely rich in heavy gold of a very fine quality. This is at the lower or southwest extremity of what is known as the Dutch Flat Mines proper, which extend from thence about one and a fourth miles northeast, to where the old channel has been cut off and destroyed by a tributary of Bear River known as Little Bear River. This Dutch Flat gravel-bed was formerly located and claimed by many different mining companies under different names, and the claims they so located still retain their distinctive appellations, though now owned by but few companies. Except at Thompson's Hill, where the ground was drifted, the former owners and locators have washed by hydraulic process and mined away the top or red gravel, leaving a surface of gravel and *débris* one-fourth of a mile wide, and a depth over the center of the channel of about 200 feet.

Here is located the Yankee claims, the main hydraulic works of the Cedar Creek Gold-Mining and Water Company, (limited,) an English corporation, which purchased from the Dutch Flat Water Company, in the spring of 1872, extensive ditch-property and large tracts of mining-ground. It is now the owner of a compact continuous tract of mining-ground from the outlet at Thompson's Hill up along the Dutch Flat Channel and southward along the channel of the South Blue, aggregating an area of 229 acres, and is about three-fourths of a mile in length, covering the deepest portion of the channel all the way. This company sank a deep shaft at the confluence of these two channels about two years ago, and struck very rich prospects. It commenced a bed-rock tunnel from the cañon of Bear River low enough to tap the whole of this tract of land. This tunnel is 8 by 9 feet in dimensions, and when complete will be 3,000 feet long with a grade of eight inches to twelve feet. About 1,265 feet of it is completed. The work is done with Burleigh drills, driven by air compressed by a hurdy-gurdy water-wheel, and costs on an average \$30 per linear foot. After running about 600 feet, a branch 36 feet long was run to the right, on an angle with the main line of about 45°, at the head of which a shaft was sunk 145 feet deep. A fine flume six feet wide was laid in the tunnel, (four feet only of which has as yet been used,) and extended down from its mouth some distance; a side flume was also constructed along the side of the cañon, with under-currents, five in all, and everything arranged in the most complete order to open up the Yankee claim from the bed-rock. Washing was commenced about the 1st of August, 1874, with one Little Giant, carrying 500 inches of water, under a pressure of 500 feet. In February last another Giant was added, and the water-supply increased to 1,250 inches. The work was continued both night and day for one year, at an aggregate expense—including cost of running 1,032 feet of main tunnel and 62 feet of branch tunnel and necessary fluming, erecting derrick, &c.—of \$35,000. The company took out in the mean time \$55,000 in gold. The use of water averaged not more than twenty days, of twelve hours each, per month, and a space of bed-rock, not over three hundred feet square, was denuded of gravel. The bank will now average about one hundred and thirty feet in height, the lower forty feet of which is the rich blue-gravel stratum, the remainder being barren detritus, the remnant of a land avalanche containing large erratic boulders. The bed-rock is trap and generally very hard. Two hundred feet of tunnel was run at an expense of from \$60 to \$100 per foot; but this was exceptionally hard and refractory. Six hundred and thirty-five feet beyond the Yankee shaft is another short branch to the Badger shaft, where another claim will soon be opened. Two Giants will be placed in position and a derrick erected with a mast 100 feet high and boom 25 feet long. A new derrick is also being erected in the Yankee with a 30-foot mast and 80-foot boom. The derricks are all guyed with wire-rope and operated by hurdy-gurdy wheels. It is the intention of the superintendent to wash through each shaft alternately, night and day, which will allow half the time in each claim for blasting and removing the large boulders. The tunnel can be run ahead at the same time and with greater facility while washing, for the car runs over the flume and the *débris* is dumped into the flume and carried off by the current, instead of being run out of the tunnel on the car.

This company will soon erect a stamp-mill to work the cement-gravel, and will, no doubt, in time, enlarge its water capacity. Its ditches have a present capacity of 6,000, but they will supply this amount to the mines, in average seasons, for from three to four months only each year. Its chief reliance is in the Placer County Canal, which is about fifty miles long, and has a capacity of 2,250 of water, which it will furnish—including the reserve from its reservoirs—for seven months each year. The reservoirs situated along the line of this ditch are three in number, with an aggregate capacity of 50,000 inches, which will supply the ditch a full head for three weeks.

There is no doubt that one of the months from April to December is, on an average, as valuable for hydraulic mining as the three months of January, February, and March. One reason is that the days are much longer. True the work goes on both night and day, still much more and better work can be accomplished in the same number of hours by natural light than by the artificial light used in the mines. But the greatest difference is caused by temperature. It is not only difficult and disagreeable for men to work in a hydraulic claim, especially at night, in weather when it is snowing, blowing, raining, and freezing, but the quicksilver used in the sluices to amalgamate the gold

congeals in cold and snowy water, and loses, to a large degree, its amalgamating properties, resulting in the washing away and loss of a much larger per cent. of quicksilver and gold in the winter than in the summer months. Consequently a good supply of water during the summer and autumn is, to every hydraulic mine, a great desideratum.

This company owns also other large and valuable tracts of mining-ground in this section, and is working three or four other claims with full forces. It has a valuable property, but it is as yet undeveloped.

The Polar Star Hydraulic Mining Company is a California corporation, composed of J. S. Colgrove, of this place, Alvinza Hayward and other San Francisco capitalists. It owns the old Buckeye mining-claim and contiguous ground, aggregating fifty acres, lying about one and one-fourth miles above the Yankee shaft, covering the entire Dutch Flat Channel at the inlet thereof. A portion of this claim has been drifted for many years, and has proved very rich. The surface-gravel has also been washed off. Adjoining this claim on the west or down the channel lies the Southern Cross, embracing the old Dutch Flat mining-claim of 40.2 acres, from which the surface has been washed, yielding \$155,000, one-fourth of which was paid out for water alone. The bottom has never been drifted. This claim is owned by some of the same parties, including Messrs. Colgrove and Hayward. Both claims cross the channel from river to river, and are second to no mining-ground in this district. Mr. Colgrove, who has been a resident of this place for many years, and is a thorough and practical hydraulic miner, is the general superintendent of both claims. He contracted with the Gold Run Ditch and Mining Company, which owned a Burleigh drilling-machine, to run a tunnel for each claim, including 600 feet for the Polar Star and 1,050 feet for the Southern Cross. The Polar Star tunnel was commenced on the 20th of August, 1875, and is now complete. It is 9 by 9 feet on a grade of 10 miles to 12 feet, and is a splendid piece of work. The head of the tunnel is under the center of the channel, 34 feet below the surface of the rock and 209 feet below the surface of the gravel. Instead of a vertical shaft, an incline is raised through the rock 46 feet and through gravel 250 feet, linear measurement. The flume is 5 feet wide. And it is the intention of Mr. Colgrove to put large-sized railroad-rails lengthwise of the flume on top of the blocking, along the whole length of the tunnel, as a conductor for the large boulders. This is a novel idea, and I believe will prove an economical and beneficial one, at least till such time as a derrick can be worked.

The hydraulic pipe is made of No. 14 and No. 16 sheet-iron, is 4 feet in diameter at the head, and tapers to 22 inches in 500 feet; thence 2,800 feet to the "twin," from which two 15-inch pipes lead into the diggings. Two thousand inches of water will be delivered from the two Giants under a pressure of 500 feet, with the line of pipe nearly straight from head to tail. The tunnel of the Polar Star opens to the cañon of Bear River, along the steep side of which a system of flumes and under-currents is being built. The work is being pushed with commendable energy, that washing may commence at the earliest possible day.

The Southern Cross tunnel opens to the same cañon, 1,200 feet west of the Polar Star. In size and grade the tunnels are the same. Over 300 feet of the latter is now completed, and the whole will be finished by the 1st of July, 1876. It is estimated that the head of this tunnel will be 40 feet below the surface of the rock and 260 below the surface of the gravel. The appointments for this claim will be the same in every particular as provided for the Polar Star. Water for each is to be furnished by the South Yuba Canal Company, under contract, I believe, and is drawn from one sand-box. All the iron pipe will be painted heavily with red lead, to protect it against corrosion.

The measuring and sand boxes are the most elaborate and the best arranged of any I have ever seen. More than 12,000 feet of lumber was used in their construction. The measuring-box is 18 by 21 feet, and the sand-box is 12 by 24 feet and 9 feet deep, divided into two 12 by 12 feet compartments.

The Franklin Gravel-Mining Company is a corporation, composed of James Teaff, of Dutch Flat; Col. J. D. Fry, L. A. Booth, Joseph Sharon, O. F. Giffin, Robert Graves, and others, of San Francisco. It owns a claim of 23.7 acres, west of and adjoining the Southern Cross, which crosses the channel from rim to rim. The gravel, no portion of which has ever been drifted, is 230 feet at the deepest, and will average about 190 feet. Mr. Teaff, who is an old and experienced miner, and who is now the superintendent of this company, was formerly the owner of this claim. He commenced working the surface as early as 1854, and is estimated to have taken out about \$200,000, spent \$55,000 in fitting up, and paid \$75,000 to \$100,000 for water alone. Under the present ownership, 400 feet of new rock-tunnel, 6 by 8 feet, opening to the cañon of Bear River, has been run this year, by hand-drilling, at an expense of about \$30 per foot. This tunnel is designed, however, not to tap the bottom of the channel, but to wash a top bench about 150 feet in depth. The flume is 4 feet wide, provided with three under-currents. This claim has a splendid hydraulic rigging, placed thereon in 1871 by the Dutch Flat Blue-Gravel-Mining Company. The pipe is 3,500 feet long, constructed of Nos. 8 and 16 sheet-iron, 5 feet in diameter at the head and 22 inches

at the tail, having a fall of about 500 feet. Mr. Teaff proposes to use 1,000 inches of water and commence washing by the 1st of March, 1876.

Indiana Hill Blue-Gravel-Mining Company is an incorporate company, having its principal place of business at the town of Gold Run, and all of the stockholders reside in the district, some of whom labor in the mine, which is located on the American River side of the divide, and embraces the very inlet of the "South Blue Channel." Many years ago the front along the rim was worked by hydraulic process on a small scale. In 1865 A. Mallory and J. Stone commenced a drift-tunnel and erected an 8-stamp mill. In 1869 it fell into the hands of the present management, and since then has produced \$150,000 up to December 18, 1875, at an expense of about \$65,000. The car contains about twenty cubic feet of earth. In the month of May, 1875, 1,000 loads, which included 150 loads of bowlders, yielded the respectable sum of \$3,100. The ground is easily worked, and averages about \$3.50 per car-load. The claim is run night and day for nine months each year, with a force of from forty to fifty men, and at the present rate of drifting the ground will last for twenty years to come. The mill is run by a hurdy-gurdy water-wheel, and the company owns nearly all the water it uses.

The Miami claim, adjoining the Indiana Hill claim on the east, comprises sixteen acres. Washing was commenced on the 1st of March, 1875. The mine produced in four months \$15,500, and to Joe Mallory about \$1,000, caught in his under-current in the cañon below. The claim used 550 inches of water, under a pressure of 250 feet, through 2,500 feet of pipe and a 4-inch nozzle. The owners, J. and R. Hoskin, netted \$3,500, exclusive of \$1,700 worth of new pipe and other movable improvements.

The Gold Run Ditch and Mining Company is an incorporation; all or nearly all of the stock is owned by residents of Gold Run and Dutch Flat. James L. Gould, one of the principal owners, has for years been the superintendent and general business manager. The company's mining-lands reach (if we except the Cedar and Sherman ground) from the claim of the Indiana Hill Blue Gravel Company north one and a quarter miles along the channel and across it from rim to rim. Including the Gold Run claim of about 50 acres, owned jointly with the Cedar Creek Gold-Mining and Water Company, (limited,) this company owns at this one place about 350 acres. All of the surface has been washed, and in many places two benches; still the gravel is at the deepest 250 feet. It is much lighter than the Dutch Flat gravel, and easier to wash. North of the railroad the company owns still another large tract of ground, covering the same channel. Some three years ago it commenced a tunnel to tap the bottom of the channel along the whole line of its principal claim. This tunnel opens into Cañon Creek, which, a short distance below, unites with the North Fork of the American River. The main tunnel, 10 by 12 feet, is now advanced 600 feet. A branch from this, 8 by 9 feet, and 1,300 feet long, has been run to open up a portion of the ground known as the Indiana Hill claim, which is now in successful operation. The aggregate cost of the tunnel and branch was about \$85,000, including the first cost of Burleigh machines, compressor and engine. This company also owns about 30 miles of ditch, which furnishes 2,200 inches of water for over seven months each year. The head of the branch tunnel for the Indiana Hill claim is 80 feet below the surface of the rock and 250 feet below the surface of the gravel. An incline was raised through the rock 125 feet in length, thence by shaft to the top. Seventy feet below the top of the shaft an incline was run to the surface, through which to wash. The flume is 6 feet wide, on a grade of 7 inches to 12 feet. Washing was commenced on the 14th of December, 1875, with 700 inches of water, under a pressure of 200 feet. From 1,500 to 1,500 inches will eventually be required. The blue bottom stratum is very hard, of course; but the bowlders are small and easily disposed of. Other claims also are worked by this company.

The Gold Run Hydraulic Company (limited) is an English corporation, owning the two claims known as the Cedar and the Sherman, comprising about 65 acres, lying next north of the Indiana Hill claim. It is most advantageously situated, nearly the whole claim lying on the deepest portion of the channel and over the line of connection of the slate and trap; consequently its bed-rock is liable to be uneven, rough, and rich. This company opens through a tunnel run for it by the Gold Run Ditch and Mining Company from the branch tunnel of the latter. It is 8 by 8 feet in size, and 950 feet long, on a grade of 8 inches to 12 feet. It has two falls, 300 feet apart, of 2 feet each, provided with under-currents. The flume is 5 feet wide, and the three tail-boxes are paved with cross-ribs 3 inches wide, faced with inch iron and set 1½ inches apart. The head of the tunnel is 52½ feet below the surface of the rock and 232 feet below the surface of the gravel, which will average in depth about 220 feet. The gravel is washed down through an incline on an angle of 50°. This claim has a superb "rigging"—2,200 feet of iron pipe, all in fine order, the upper half being new pipe, made of No. 16 iron and heavily coated with red lead. It is 4 feet in diameter at the head and tapers to 16 inches 400 feet below. It has a fall of 225 feet, and, under the pressure attainable in the sand-box, is capable of receiving 3,000 inches of water. Heretofore miners have puzzled their brains to devise the best means of keeping out of their pipes the

air-bubbles which are forced into the water by the stream falling into the sand-box. They have now concluded that the most natural and efficient remedy is to construct their sand-boxes so large and in such a manner that the bubbles of air will rise to the surface before reaching the pipe. Strange that so simple an idea should be so long developing! The sand-box built for this company is 10 by 12 feet, and 8 feet deep. The water flows into the box at the northeast corner, and strikes against a solid bulk-head about midway of the box. It is thus turned to the west end, passes through a grating, and is received by the pipe at the southwest corner, relieved of all air.

The extinct rivers of the auriferous belt of California.—I am indebted to the same gentleman (Mr. C. J. Brown, of Dutch Flat) for the following interesting discussion of the ancient river-system of this region. Mr. Brown is an active and intelligent investigator in the field, and I consider his views worthy of attention, though they differ in some respects from those of other observers. I do not undertake, from limited personal knowledge, to decide between opposing theories. Mr. Brown holds that the waters which deposited the ancient gravel-beds in Placer County ran northward. His provisional location of the channels may be, he admits, in many points erroneous, but his main proposition he believes he has proved. Other trustworthy students confirm it, particularly with regard to what he calls the "South Blue," which, they say, undoubtedly ran from south to north, and intersected another channel somewhere between Dutch Flat and Nevada City:

The great auriferous belt of California is situate upon the western slope of the Sierra Nevada. The bed-rock of this belt consists principally of trap, serpentine, and talcose slate. Its average width from east to west may be estimated at forty miles, and it extends from Fresno County on the south to the southwest corner of Oregon on the north, a distance of several hundred miles. Narrow at the south, where it dips beneath the alluvial deposit of the San Joaquin Valley, it gradually widens to the northward, till it is lost beneath the waters of the Pacific.

A line drawn through its center would run north-northwest and south-southeast, parallel with the western summit of the Sierra Nevada, forty miles to the westward thereof, at an average altitude of about 3,000 feet above the sea.

Within this belt are three distinct talcose-slate strata—the western or lower, the middle, and the eastern or upper, which are separated by strata of other rock.

The rock separating the lower and middle slate is highly metamorphic, and is not distinct or continuous along the whole line of the auriferous belt, but contains, in places, rich-quartz veins, as at Colfax, Placer County. Upon the lower or western belt of slate are situated many mining-towns of note. It passes under Oroville and dips beneath the valley of the Sacramento, cropping out again in the counties to the north-west. This stratum all along from Amador County on the south to Yuba County on the north is rich in its numerous gold-bearing-quartz ledges and veins. As it was not eroded by the old Pliocene rivers, except where the Big Blue and the San Juan Channels crossed it, it has been extensively worked for its rich, shallow placer and ravine-mines. It is highly probable that the deepest auriferous-gravel banks lying along this stratum in Tehama, Shasta, Trinity, and Klamath Counties are, in part at least, submarine; but, however this may be, it is foreign to my purpose to discuss at length the character and features of this slate-stratum.

I purpose to speak more particularly of the middle and upper slate-strata, since along these the extinct rivers are most distinctly marked. They are separated by distinct strata of trap and serpentine, the latter skirting the upper slate and the former the middle slate. These different strata run parallel, so to speak, to each other, lengthwise of the belt.

It must not be supposed that the different strata of rock can be correctly represented in their exterior individual limits by arbitrary lines; at places they are narrow, and again expand to a greater width.

In Nevada, Sierra, Plumas, and Lassen Counties, the slates are found even to the summit of the mountains, while in Shasta and the eastern portion of Tehama County they are narrowed by the lava-field which caps them.

In the vicinity of Nevada City granite predominates. A little to the southeast, and between Green Horn River and its tributary—Little Green Horn—exists a mountain of syenite. So at other places along the auriferous belt we find other varieties of rock.

The slate-strata are largely composed of talc and are quartz-bearing, containing all the principal gold-bearing-quartz ledges and veins, from which, in part, the gravel and gold filling the old channels came.

Miners, at one time, very generally held the opinion that the old channels were worn in the bed-rock by ocean-currents, and that the deep gravel and *débris* which fill them were the deposits of the sea. They did not comprehend the fact that the quality of gravel they were daily washing away refuted such an hypothesis; nor that their deep beds of pipe-clay, which would preserve in fossil the most delicate fern for an eternity, if undisturbed, were pregnant with fossilized earth but no sea-vegetation, nor any marine remains of any kind. Moreover, in the ancient gravel-deposits there are no lava boulders or pebbles.

Superficial reasoners who held to the marine theory were occasionally confirmed in their opinions by newspaper articles upon the gravel-deposits of Shasta County or the gold-coast of Klamath and Del Norte, and at once jumped to the erroneous conclusion that the gravel there found was the *product* of the ocean, and as the coast-deposits were in some sense submarine, so too must be the gravel-deposits along the Sierras in Central California.

At the present time, however, it is generally admitted by all who reason upon the subject that these old channels are remnants of ancient and extinct river-systems, of which there are three or four, distinct and separate. I shall write of only one of them, known among the miners as the Big Blue.

The Blue Lead occupies the central portion of the great auriferous belt, from Calaveras County on the south to Plumas County on the north, and drained a country two hundred miles, and possibly more, in length.

Within the last few years a number of writers well known among the literati of California have published essays upon these extinct rivers. They, with but one exception, write of the so-called Big Blue as being at one time a very large river which flowed southward through Sierra, Nevada, and Placer Counties. The one exception says: "I have arrived at the conclusion that the Pliocene rivers have not varied in their general course from that of the present rivers;" meaning, of course, the "present rivers" crossing the auriferous belt.*

The idea that the Big Blue flowed southward is not new. All these writers are compelled to admit that great changes have taken place in the altitude and general topography of this entire region since the now extinct rivers flowed through it, since it would be highly unreasonable to suppose that a stream of any magnitude would flow for miles along the side of a high mountain-chain parallel with the trend of its main summit at an altitude of from three to five thousand feet above the level of the sea. And yet they base their assumption that the so-called "Big Blue" flowed through these counties to the southward upon the single fact that there is at present a down grade toward the south along the line of the deepest gravel-deposits.

The theory which I have entertained for many years may be explained by our present river-system, which, though larger, is copied from the ancient one. We now have the Sacramento from the north, and the San Joaquin from the south; their waters meet and flow into the ocean through the Golden Gate. All their principal tributaries take rise in the mountains to the eastward.

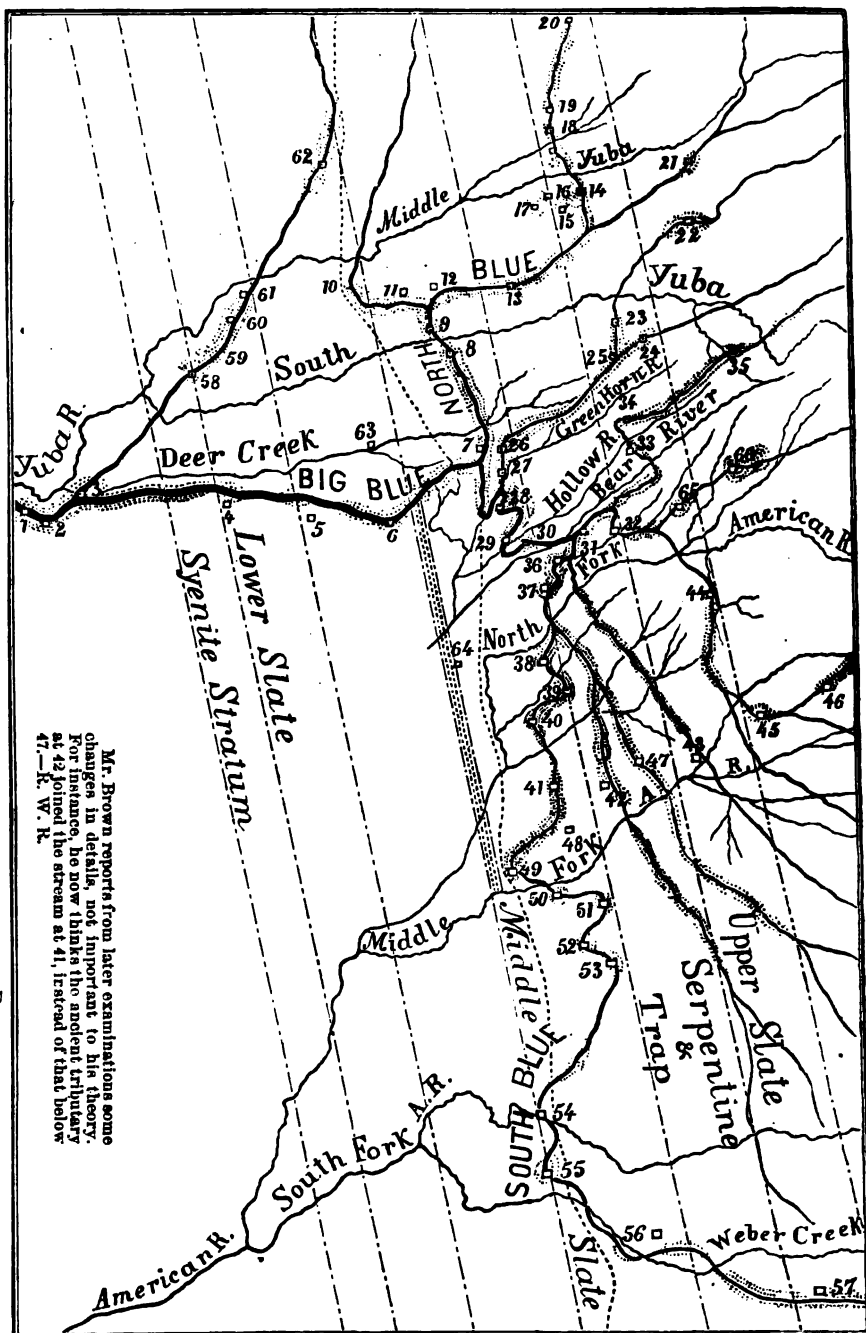
The middle slate-stratum of this auriferous belt was probably no higher above the level of the ocean at the time the cañons of these extinct rivers began actively to fill with gravel, than the valleys of the Sacramento and San Joaquin are at present; Sacramento City being but 65 feet in altitude. These two large valleys were then a part of the ocean, and the Coast Range of mountains cropped out of it a long line of island reefs.

What in Sierra County and the northern portion of Nevada County has been known as the Big Blue, I call the North Blue. *It flowed southward.* What in Placer County and the southern portion of Nevada County has been called the Big Blue, I call the South Blue, because it flowed *northward*. This truth could have been easily ascertained by all of the writers who have preceded me upon this subject had they taken sufficient pains to gather the evidence. The deposit of gravel, sand, and gold, and the position of the boulders upon and near the bed of the old river at Yankee Jim's, Iowa Hill, Indiana Hill, Dutch Flat, Little York, You Bet, and Red Dog all tell the same tale and point the index-finger northward as unerringly as the needle of the mariner's compass.

The North and South Blue, corresponding to the Sacramento and the San Joaquin Rivers, were the two main branches of the Big Blue, which took their rise, as did also their tributaries, in what was then the rising hilly upland to the eastward. They ran down upon, and for many miles along, the soft rock of the upper slate; thence across the intervening, non-gold-producing strata of serpentine and trap—which latter strata average about seven miles in width—to the middle slate; thence generally along this

* It is a fair presumption that the writer of the sentence above quoted did not mean the "present rivers crossing the auriferous belt," but the present system of drainage, i. e., the Sacramento and San Joaquin, which flow respectively from N. to S. and from S. to N. and nearly at right angles to their tributaries, the Feather, Yuba, American, Stanislaus, &c., the general course of which is from E. to W.—R. W. R.

EXTINCT RIVER-SYSTEM OF THE CALIFORNIA AURIFEROUS BELT.



Mr. Brown reports from later examinations some changes in details, not important to his theory. For instance, he now thinks the ancient tributary at 42 joined the stream at 41, instead of that below 47.—R. W. R.

stratum to their confluence, a short distance south of Scott's Flat, in Nevada County, forming the Big Blue, which ran thence for eight or nine miles southwesterly to Buena Vista Slide; thence north of Grass Valley to Alta Hill, down north of Rough and Ready to Mooney's Flat, Smarteville, and Timbuctoo, emptying thence into the then ocean not far to the west of the latter place.*

The locality of the confluence of the North and South Blue is now occupied by a high mountain of volcanic origin. The stage-road from You Bet to Nevada City crosses the channel of the Big Blue just to the northwest of Gregory's old saw-mill site. It is a very wide channel, and is deeply covered with lava for seven or eight miles, but as it nears the town of Grass Valley it has become obliterated by erosion.

The accompanying sketch is intended to represent my theory of the extinct river-system which once drained the central portion of the great auriferous belt, with the rivers of the present system crossing the same. It includes a tract of country sixty miles north and south and forty miles east and west. The courses of the present streams, the locality of the towns, and the relative distances are taken from the United States survey. The principal strata of rock are represented by arbitrary lines, merely to convey a general idea of their approximate relative positions, regardless of their irregular widths and sinuous exterior limits as represented by the dotted line which shows more correctly the western boundary of the middle slate-stratum. The dotted streams represent the extinct rivers filled with gravel. It must not be supposed that all or even a major part of the Pliocene streams are traced on the sketch. Many of the smaller and shallower ones are wholly obliterated by erosion, and many are buried under the lava and await discovery by the prospector. At many places along the line of those traced, as at Forest Hill and Deadwood, two, three, and sometimes four channels are known to exist, usually running in the same general direction and within a mile of each other, made, no doubt, by one and the same stream at each locality, but at different periods; the water being forced from its channels successively by the deposition of gravel, and compelled to cut a new channel. The wide dotted space just west of the town of Colfax I pronounce a sea-beach. It is very ancient, having the same trend and strike as the contiguous rock. It is a stratum of sand and bowlders about three-fourths of a mile wide, but in truth is now a stratum of bed-rock, so to speak, for it underlies the deepest of our present streams. I mention it here as a curiosity only, not knowing that any mention of it has heretofore been published. The old village of Illinoistown is located upon it, and it is easily traced by any one curious enough to inspect it.

The towns and important localities are numbered thus:

- | | | |
|-----------------------|-----------------------|---------------------|
| No. 1. Timbuctoo. | No. 23. Phelps Point. | No. 45. Deadwood. |
| 2. Smarteville | 24. Alpha. | 46. Last Chance. |
| 3. Mooney's Flat. | 25. Phelps Hill. | 47. Bath. |
| 4. Rough and Ready. | 26. Quaker Hill. | 48. Todd's Valley. |
| 5. Grass Valley. | 27. Hunt's Hill. | 49. Peckham Hill. |
| 6. Buena Vista Slide. | 28. Red Dog. | 50. Gravel Hill. |
| 7. Scott's Flat. | 29. You Bet. | 51. Bald Mountain. |
| 8. Blue Tent. | 30. Little York. | 52. Mamaluke Hill. |
| 9. Grizzly Hill. | 31. Dutch Flat. | 53. Georgetown. |
| 10. Cherokee. | 32. Alta. | 54. Coloma. |
| 11. North Columbia. | 33. Lowell Hill. | 55. Gold Hill. |
| 12. Kennebec Hill. | 34. Remington Hill. | 56. Placerville. |
| 13. North Bloomfield. | 35. Diamond Creek. | 57. Newtown. |
| 14. Snow Point. | 36. Gold Run. | 58. French Corral. |
| 15. Orleans Flat. | 37. Indiana Hill. | 59. Birchville. |
| 16. Moore's Flat. | 38. Iowa Hill. | 60. Sweetland. |
| 17. Woolsey's Flat. | 39. Wisconsin Hill. | 61. North San Juan. |
| 18. Allegany. | 40. King's Hill. | 62. Camptonville. |
| 19. Forest City. | 41. Yankee Jim's. | 63. Nevada City. |
| 20. Downieville. | 42. Forest Hill. | 64. Colfax. |
| 21. Bunker Hill. | 43. Michigan Bluffs. | 65. Blue Bluffs. |
| 22. Gaston Ridge. | 44. Damascus. | 66. Lost Camp. |

Thus I have set forth what I believe to be the true theory of the formation of the ancient channels which underlie, are filled with, and in many places are deeply buried beneath the auriferous earth and gravel which constitute our hydraulic and drift mines.

* The present course of the San Joaquin and Sacramento Rivers is apparently the result of the position of the Coast Range, offering only one outlet to the sea at San Francisco. It is difficult to see how a similar course of the Pliocene rivers could have come to pass with the Coast Range out in the ocean.—R. W. R.

These ancient river-channels became filled with auriferous earth, gravel, and *débris* during the slow upheaval of the land. This rise was most rapid to the eastward, along the line of the summit of the Sierra Nevada, and required a great many thousand years for its accomplishment; for if we allow a rise of two and one-half feet every century, (a very high estimate if we allow no interval of repose,) it would require four thousand centuries, or four hundred thousand years, to elevate the land ten thousand feet and place the summit where it stands to-day.

Evidently the land rose more rapidly toward the north than to the south, which action gives a present grade southward of many feet to the mile. It also had the effect, from the first, of lessening the grade of the South Blue. If we allow a slightly more rapid elevation at and near the junction of the North with the South Blue than at other points along the middle slate—and such an assumption may not be unreasonable—the effect would be to lessen the grades of both these large streams, while, as the land arose to the eastward, the currents of all the tributaries to the South and North Blue, and even theirs, from their sources for some miles along their courses, were accelerated from century to century, and the land reaching gradually into the higher, consequently the colder, regions of atmosphere, condensed continually more and more moisture, which fell as snow and rain, thus increasing the volume of water, which alone would increase the rapidity of the currents. Their channels were deeper; the quartz ledges and veins were cut down; slides occurred on all sides; trees slid into the streams, and the entire surface of the land became in time denuded. This mass was deposited in these old streams, washed away, redeposited and reworked at each succeeding freshet, over and over again and again, till it found its final place in the Big Blue, the North Blue, and the South Blue, whose currents were too sluggish to carry it along to the ocean. It blocked up these streams, (and set back into the mouths of the tributaries,) spreading out to a great width along nearly their entire course, but principally along the middle slate stratum, where it accumulated, at least in Placer and Nevada Counties, to the depth of eight hundred feet, and extended toward the east a level plain for a distance of from three to five miles.

It should be borne in mind that the grades of the main streams along the middle slate-stratum were yearly lessening by the continuous deposition of this great mass of gravel, earth, and *débris*. Judging from the depth of vegetable soil which accumulated upon its surface, this enormous deposit of alluvium must have remained for centuries a verdant field crowned with a luxurious forest. It was subsequently desolated by volcanic overflows.

Great lava-fields extended from Central Oregon to Tejon Pass, from the summit of the Sierra Nevada to the valleys of the Sacramento and the San Joaquin, and eastward throughout the Great Basin. During this long era the lava from hundreds of volcanoes or craters poured over the land, filled the old channels left unfilled by gravel, covered the lateral mountain-ridges to a level, flowed over and covered up the ancient gravel-deposits, of which those now lying along and to the east of the upper slate stratum are mostly still covered by it, in places to the depth of a thousand feet or more.

It is my opinion that during this epoch the ancient rivers were obliterated; and it is possible that the heat was so intense as to vaporize and drive away all moisture, to the extent that no stream of any magnitude existed upon this desert waste.

It is patent to the most superficial observer that our present rivers had their origin upon the surface of the lava, down through which and into the underlying strata of rock they have eroded immense cañons, in some instances to the depth of 3,000 feet below the present surface, and more than 2,000 feet below the bed of the extinct rivers. Along the middle slate-stratum every stream dignified as a river crosses it at a depth of from five to fifteen hundred feet below the old river-channels. The effect, after these streams had cut down through the lava and into the deep gravel-deposits, can readily be imagined. The earth and gravel slid into the cañons from beneath the lava, which, left without support, broke down of its own weight, and was, together with nine-tenths of the alluvial deposit along the middle slate-stratum, swept into the valleys to the west, partially by the rivers, but principally, no doubt, by the great ice-drift which, during a long glacial epoch, scoured these mountains from summit to base. Thus we are enabled to comprehend why these old gravel-deposits are free from volcanic lava and detritus, while the lateral mountain ridges or present river-divides terminate to the east of them abruptly, capped with lava three or four hundred feet in depth.

NEVADA COUNTY.

This county, situated in the central portion of the State, has maintained its position as the leading mining-county since the discovery of gold. It derives its importance both from the extent of its deposits of auriferous gravel and the number and richness of its quartz-lodes. The

following table, compiled from the official returns to the surveyor-general, will exhibit the condition of mining from 1870 to 1875:

Year.	Quartz-mills.	Tons crushed.	Mining-ditches.	Length, in miles.	Miners' inches of water used per day.
1870	73	125, 000	53	875	42, 400
1871	80	190, 000	70	948	36, 225
1872	46	105, 633	74	637	32, 000
1873	43	100, 000	76	707	40, 000
1874	46	80, 000	73	625	40, 000
1875					

The above returns are approximately correct, so far as active mining-operations are concerned. Langley's Directory of the Pacific Coast shows a larger number of mills for corresponding years, but in many instances the mills were idle.

The principal quartz-mining district is Grass Valley. This branch of mining commenced here in 1851 and has been prosecuted with great regularity since that time. In 1867 there were twenty-two quartz-mills in operation, with 280 stamps, and a crushing-capacity of about 400 tons per day. These mills cost, in the aggregate, \$140,000. While at the present time there are fewer mills in operation, they are more effective, and the results and general product per year do not vary greatly from that of former years.

Grass Valley is distant from Sacramento sixty-five miles, and twelve miles from the line of the Central Pacific Railroad, with which it is connected by a branch narrow-gauge railroad. The elevation is 2,300 feet above the level of the sea; the climate pleasant and salubrious, and favorable for mining-operations throughout the entire year. Snow rarely falls, and remains on the ground but a few days. Wood is abundant and cheap, and in many instances water-power is available for crushing the ores during more than one-half of the year.

Quartz-mining forms the principal industrial interest, and has been continuously prosecuted with a uniform degree of success nowhere else attained. The aggregate product down to the present time of the quartz-veins of the district, situated within a radius of four miles, may be estimated at thirty millions of dollars. Of this amount nearly one-fourth was produced from the Massachusetts Hill, New York Hill, and Gold Hill veins, which are supposed to be continuous veins of the same system.

The gold-bearing rocks of Grass Valley are mostly metamorphic schists or greenstones, alternating with belts of syenite. The quartz-veins are generally not large. Two feet is probably a full average thickness, while some of the most productive have not averaged over one foot. The metallic contents of the veins of the district vary to an extreme degree, some carrying little or no visible gold, although the mill-workings are satisfactory and the sulphurets are found to be abundant on concentrating the sands resulting from crushing. The gold is easily saved, being clean, angular, and not very small; hence the proportion saved by the mill-process is notably greater than in any other locality in California. The sulphurets occur as a rule in the proportion of 2 per cent. of the gold-bearing rock. These are easily concentrated, and yield by the chlorination process an average of \$100 per ton net,

the value of the rock ranging from \$25 to \$50 per ton. The district contains from ten to twelve mines which are continuously productive, more than half of these being worked with great profit to the owners and the balance being self-supporting. There are also a dozen or more mines in various stages of development, and a few on which work has been temporarily suspended.

The cost of mining supplies and labor in Nevada County is as follows:

Wages of first-class miners, \$3 per day; shovelers and car-men, \$2.50 per day; surface laborers, \$2 to \$2.50 per day; Chinese labor, \$1.50 per day; cost of lumber, \$15 to \$16 per 1,000 feet; mining-timber, 5 to 12 cents per running foot; cord-wood, \$4 to \$5 per cord; common powder, \$2.50 per keg of 20 pounds; giant powder, 50 to 75 cents per pound; fuse, \$5 per 1,000 feet; quicksilver, 75 cents per pound; candles, \$4 per box.

The operations of the principal mines are shown by the accompanying tables and the annual reports of their officers. The principal mines have been described in detail in my former reports. Within the past year the New York Hill Mine, which had been closed for several years, has been re-opened and actively worked, and promises to rank among the leading mines of the district. The following extracts are taken from a report on this mine by W. A. Skidmore:

The New York Hill ledge is situated two miles south of the town of Grass Valley, on New York Hill, which forms a portion of a continuous ridge lying west of Wolf Creek, and having a general north and south trend. The only topographical feature of importance is the occurrence of several ravines running westward from the creek and intersecting the ridge at right angles. The most deeply indented ravine forms the dividing line between Massachusetts Hill and New York Hill, although this ravine does not cut through the ridge, and the surface of the hill is very nearly level for a distance of one mile on the line of the outcrop of the ledge. The elevation of the summit of the ridge is in no place more than 300 feet above the bed of Wolf Creek, which forms the main drainage of the water-shed of the eastern side of the ridge. A belt of greenstone about one-half mile in width runs in a general northwest and southeast direction diagonally across the ridge. On either side of this belt occur zones of syenite, which have exerted an influence on the metamorphism of the greenstone, which was doubtless of sedimentary origin. The New York Hill ledge runs through this greenstone belt in a northwest and southeast course, starting from Wolf Creek and running thence 2,844 feet toward Massachusetts Hill, and having an average dip of 30 degrees north, and a thickness of from ten to thirty inches. The average thickness of the main vein would therefore be from fifteen to eighteen inches, although at times stringers of quartz are found on the hanging-wall side of the vein, varying in thickness from four to six inches; these are not, however, taken into consideration in the estimation of the average width of the vein.

The quartz is white to dark blue in color, vitreous in texture, more or less sprinkled with gold visible to the eye, uniformly sulphureted to the extent of 2 per cent., and very tractable to the ordinary mill-process. The yield has varied from \$20 to \$60 per ton, exclusive of the rich specimens of free-gold-bearing rock of which this mine has always been remarkably prolific. It would be difficult to state the milling average of all the rock taken from the mine during the past twenty years. The present yield is about \$40 per ton of 2,000 pounds, exclusive of the rich specimens which are sold to jewelers to be manufactured into quartz ornaments. This latter class commands from \$25 to \$30 per ounce of gold contained in the rock, the value of each piece being determined by its specific gravity.

The New York Hill Company ground embraces a consolidation of the Larimer, Sikes, Wilde, Fricot, and Chavanne claims, together with many claims of lesser note, of which no record of working and production can now be obtained. Locations were made here as early as 1851, under the mining-laws then in force, which required that locations should be made in a square form, and limited each claim to 100 square feet in area. This remained in force for nearly two years, during which period the claims which presented an outcrop were worked out from the surface to the limit of the owners' ground. Subsequently the laws were amended and locations were made on the line of the lode with the dips, spurs, and angles, as at the present time provided for by the general mining-law of the United States. Then followed a more vigorous system of mining; shafts were sunk, and levels run, and the quartz crushed at rude

custom-mills, yielding, in all cases, with the imperfect process then in use, a fair and sometimes a large profit. As depth was attained water was encountered, necessitating pumping-apparatus, and the character of the rock changed from free-gold-bearing to sulphureted ores. The average yield declined by reason of the inadequacy of the mill-process then in use, and expenses increased. This was in the era of high prices and high freights, and before the introduction of the powerful pumping and hoisting machinery now in general use. Consequently, when the water-level was reached, (about 100 feet in depth on the pitch of the ledge,) mining-operations were suspended. At this period rock could not be worked with profit which did not yield at least \$30 per load, equivalent to \$20 per ton. At the present time and under the same circumstances, rock of that grade would yield a large profit.

The total amount of bullion taken from the 2,844 linear feet of ground now owned by the New York Hill Company, from the discovery up to the date of the consolidation in 1865, may be safely estimated at \$500,000. During the years 1866 and 1867, the mine produced \$106,427.66, from 2,189 tons of rock, or at the rate of \$48.93 per ton. The mine then remained closed for several years, when it passed into the control of the late Mr. A. Delano, who opened the mine by a tunnel from Wolf Creek, and struck ore on September 8, 1874. From this time till the close of the fiscal year ending June 30, 1875, the mine produced \$57,582.24 from 14,000 tons of ore.

From the fiscal year commencing August 1, 1875, to October 30, 1875, a period of three months, the results were as follows:

Month.	Tons.	Average yield per ton.	Product.
August, 1875.....	540	\$49 20	\$26, 570 85
September, 1875.....	422	41 66	17, 581 18
October, 1875.....	365	28 27	10, 321 36
Totals.....	1, 327	41 05	54, 473 39

The returns for October did not include the proceeds from the sulphurets for that month, and therefore afford an unerring standard of the free-gold value of the rock crushed. The October sulphurets, 22 tons, were worked during the first week in November, and yielded \$1,753.17, which should be added to the free crushing, making the yield for the month \$12,074.53 from 365 tons of rock, or an average of \$33.08 per ton. This makes the true average for the first quarter of the fiscal year \$42.37 per ton, instead of \$41.05, as appears by the above tabular statement.

The main adit has attained a length of 918 feet. It is 6 feet in height by 4 feet in width, and laid with car-track throughout the entire length. The cost was between \$10 and \$11 per foot, or say \$10,000. This tunnel serves for drainage, and will be carried forward as exploration progresses.

The Snyder shaft has attained a depth of 500 feet, on an angle of 33 degrees, and cost \$40 per foot, including timber and track. It is 12 feet wide by 6 feet in height, with three compartments, two for hoisting and one for gangway and pump-rod. The shaft is heavily and substantially timbered from top to bottom. Aggregate cost, \$20,000. An 8-inch pump has been carried to the bottom, by means of which the water from the lower levels is lifted to the main adit, discharging in Wolf Creek. A 4-inch-plunger pump on the adit-level station forces water through a 2½-inch pipe to tanks on the surface, supplying the boilers.

The upper tunnel starts from a point on the hill-side above Wolf Creek 200 feet north of the Snyder shaft, and 130 feet higher on the hill, (vertical,) and runs 450 feet to its connection with the Wilde shaft, following the course of the vein and passing through chute No. 3 a distance of 270 feet. This tunnel cost about \$3,500, and is an invaluable adjunct to the working of the southeastern portion of the company's ground, by reason of its influence on the ventilation of the mine.

The total cost of the shafts and tunnels constituting the working avenues of the mine was \$62,500, and the cost of the machinery constituting the "plant" about \$30,000 more. The company has leased a 20-stamp mill, with water-privilege accompanying, for \$275 per month. Fifteen stamps are run on the company's rock, crushing 30 tons per day, the remaining five stamps being employed on custom-work, for which \$4 per ton is charged. The mill is run by water-power during the greater portion of the year. Sulphurets are concentrated by Hendy's apparatus and sluice-boxes, and sold to the chlorinators.

The expense of milling in Grass Valley district is dependent on the motive-power used and the character of the gold saving and concentrating apparatus. The following are estimates of leading mining engineers of the Pacific coast. According to the report of Mr. J. H. Boalt on the Empire Mine, made in 1870, and quoted in the Report of the United States Commissioner of Mining Statistics for that year, (p. 49,) the cost of crushing rock, concentrating, and working the sulphurets was at the rate of \$2.92 per ton of rock—the motive-power being steam. In the Eureka and Idaho Mills, of the same district, the cost has been about \$3 per ton for several years with steam-power. Mr. G. T. Deetkin, in an elaborate paper on the California gold process, published in the Report of the Mining Commissioner for 1873, (pp. 300, 331,) estimates the cost of simple crushing by steam at \$2.04 per ton, and by water at \$1.63 per ton.

The New York Hill Mill is run alternately by water and steam, according to the season of the year, and sometimes by both powers combined. The cost of milling, including concentration, varies from \$1.75 to \$2.25 per ton, and \$2.12½ per ton is a fair average for the entire year. This, added to the contract-price for hauling—37½ cents per ton—would make the cost of handling and treatment of ore \$2.50 per ton.

I quote further from Mr. Skidmore's report:

The labor pay-roll of the company varies from month to month, according to the nature of the work and the condition of the mine. The number of employes at mine and mill is from 100 to 150. Of this number one-half are skilled miners, the others laborers, mill-men, mechanics, &c. For the purpose of estimating the cost of mining, hoisting, and pumping, I have taken as a basis 500 tons of rock raised, and the expenses incident thereto as follows:

Five hundred tons ore.

Labor for mining and hoisting.....	\$6,011 75
Wood for fuel.....	96 00
Candles, powder, fuse, and cartridges.....	224 85
Timbers for support of ground.....	98 40
Iron and steel, charcoal, oil, &c.....	106 20

6,537 20

Or \$13.07 per ton.

During the progress of extracting ore, dead-work is carried on for the purpose of developing reserves. This class of work consists of sinking main shaft, timbering, running levels, raising waste-rock, pumping, &c.

The following statement, compiled from the company's expense-account, will show the cost, per ton of ore produced, of carrying forward the permanent work of the mine:

Record of four months' dead-work.—Cost of developing 5,700 tons of ore, including pumping.

Sinking 100 feet shaft, on contract, \$30 per foot.....	\$3,000 00
Timbering same, including material.....	66 73
Driving 800 feet drifts, on contract, \$7.50 per foot.....	6,000 00
Hoisting, pumping, &c., including labor.....	3,764 00

12,830 73

Or \$2.22 per ton.

We have, then, the following recapitulation of the expenses incident to mining, milling, and dead-work:

Mining, hoisting, and pumping.....	Per ton. \$13 07
Dead-work, or developing new ground.....	2 22
Hauling quartz to mill.....	37½
Milling and concentrating sulphurets.....	2 12½

17 79

Summary.

Cost mining and milling per ton	\$15 57
Cost necessary dead-work in advancing development.....	2 22
	17 79

Yield of the New York Hill Mine, from September 8, 1874, to November 9, 1875.

1875.		
July 29. Balance from annual statement	\$53,551 69	
Aug. 16. 5 bars bullion	24,745 46	
Aug. 16. 18½ tons sulphurets yielding } from 540 tons of rock }	1,825 39	
Sept. 29. 3 bars bullion	\$15,954 38	
Sept. 29. 15½ tons sulphurets } from 422 tons rock }	1,626 80	
	17,581 18	
Oct. 7. 2 bars bullion, 365 tons rock.....	10,321 36	
The sulphurets were worked in November.		
Nov. 9. 3 bars bullion	\$17,261 93	
Nov. 9. 22 tons sulphurets, yielding	1,753 17	
	19,015 10	
Yield	127,040 18	
Add premium on gold bars and returns from sales of specimens in San Francisco	2,944 82	
Total yield.....	129,985 00	
Gold taken out from first striking the ledge up to Mr. Delano's death, September 8, 1874	4,030 55	
	134,015 55	
Total yield since re-opening of mine.....	134,015 55	

The secretary of the Eureka-Gold Mining Company presents the following report for the year ending September 30, 1875 :

RECEIPTS.

Book-accounts :

Balance of cash on hand October 1, 1874....	\$90,797 96	
In hand of the superintendent	7,342 40	
	\$98,140 36	

Bullion-account :

Proceeds from ores worked	97,801 91	
Proceeds from assay-chips ..	21 72	
Proceeds from sulphurets worked.....	820 50	
Proceeds from assay-chips	1 73	
Proceeds from sulphurets sold.....	1,445 50	
	100,091 36	

Milling-account :

Merchandise sold.....	332 15	
Grinding sand, &c., for McDougal Works ...	240 00	
Crushing for outside parties	153 00	
	725 15	

Mine-account :

Merchandise sold	21 00	
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Wood-ranch :

For wood sold	100 37	
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Wood-account :

For 2,868½ cords of wood transferred to sundry accounts...	12,897 56	
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Interest-account :

For interest received on loans	5,700 00	
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Premium-account:	
For premium on bars sold.....	\$446 55
McDougal Works:	
For returns of gold saved.....	450 56
	<u>21,572 91</u>

DISBURSEMENTS.

Mining-account:	
Paid for wood	\$8,804 81
Paid for lumber.....	769 99
Paid for poles.....	762 86
Paid for charcoal.....	374 00
Paid for powder and fuse.....	1,246 61
Paid for foundery-bills	102 33
Paid for hardware and steel.....	1,657 33
Paid for merchandise	3,121 61
Paid for freight and hauling.....	15 75
Paid for pay-rolls	50,725 00
Paid for labor by contract.....	10,908 00
Paid for salary of superintendent.....	6,000 00
Paid for surveying	15 00
Paid for iron pipe.....	70 40
Paid for tribute-men for mining.....	1,286 75
Paid for water.....	50 00
Paid for fire-insurance.....	593 75
	<u>86,504 19</u>
Deduct amounts for labor and materials transferred to sundry accounts	47,154 93
	<u>39,349 26</u>
Dead-work	43,667 50
Wood-account:	
Paid for wood	13,083 41
Eureka No. 2 Mine.....	18,476 54
Eureka No. 3 shaft.....	2,840 47
Milling-account:	
Paid for wood.....	\$4,092 75
Paid for foundery-bills.....	485 12
Paid for hardware.....	357 80
Paid for sluice-blankets.....	265 50
Paid for chemicals and merchandise	454 14
Paid for water-rent.....	581 25
Paid for pay-rolls.....	8,566 00
Paid for hauling.....	13 50
Paid for fire-insurance.....	397 50
	<u>15,213 56</u>
Bullion-expenses:	
Paid for assaying bars.....	128 90
Paid for freight on same.....	259 25
	<u>388 55</u>
Mine-purchase:	
Paid I. T. McDougal for real estate and royalty to use his patent.....	800 00

McDougal Works :

Paid for pay-rolls and grinding sand..... \$240 00

General expenses..... 6,163 74

Sulphuret-concentration :

Paid for pay-rolls..... 1,042 00

Wood ranch :

Paid for hauling..... 88 75

Sulphuret-reduction :

Paid for working sulphurets..... 243 00

Discount-account :

For discount allowed on bars sold..... 1 96

Book-account :

Balance of cash on hand September 30, 1875	\$72,068 97	
In hands of the superintendent.....	1,571 17	
Due from the estate of A. Delano, Grass Valley	3,334 43	
		76,974 57
		218,572 91

Assets and liabilities.

ASSETS.

Available.—On hand September 30, 1875.

Book accounts.....	\$76,974 57	
4½ tons of sulphurets, estimated value	200 00	
100 tons of ore broke in mine, cost \$9.....	900 00	
250 tons of ore on surface, cost \$10.....	2,500 00	
179 cords of wood.....	792 22	
Supplies at mill.....	1,100 00	
Supplies at mine.....	900 00	
		83,366 79

Real estate.

Mill, estimated value.....	\$20,000 00	
Mine improvement and buildings, estimated.....	15,000 00	
McDougal Works.....	1,000 00	
Wood ranch, 160 acres.....	950 00	
		36,950 00
		120,316 79

LIABILITIES.

None.

Mine-statement.

October 1, 1874—Ore on surface	325 tons	
Ore hoisted during the year	4,235 tons	
September 30, 1875—Ore on surface	250 tons	4,560 tons
Ore worked at the company's mill during the year		4,310 tons
September 30, 1875—Ore on surface	250 tons	
Ore broke in mine	100 tons	
Ore reduced during the year	4,310 tons	
October 1, 1874—Ore on surface	325 tons	4,660 tons
Ore broke in mine	350 tons	
		675 tons
Ore mined during the year		3,985 tons

Sulphuret-statement.

October 1, 1874—Number of tons on hand	16½ tons	
Number of tons concentrated during the year	27½ tons	
September 30, 1875—Number of tons on hand	4½ tons	43½ tons
Number of tons worked during the year	9 tons	39½ tons
Number of tons sold	30½ tons	
		39½ tons

Ore-statement.

4,310 tons of ore worked by mill-process, yielded \$97,823 63

Also sulphurets as follows:

9 tons worked by chlorination, yielded	\$822 22	
30½ tons sold yielded	1,445 50	
	2,267 73	
Less 16½ tons on hand October 1, 1874—estimated value	700 00	
	1,567 73	
Add 4½ tons on hand, September 30, 1875—estimated value	200 00	
Add result of McDougal Works		1,767 73
		450 56
		100,041 92

Or an average of \$23.21 per ton.

Average yield of sulphurets, \$91.36 per ton.

Average yield of sulphurets sold, \$47.39 per ton.

Bullion-statement.

As reduced by mill-process :
Average fineness, .844 $\frac{1}{2}$ —equal to \$17.45 $\frac{92}{100}$ per ounce.

As reduced by chlorination-process :
Average fineness, .985 $\frac{1}{2}$ —equal to \$20.37 $\frac{50}{100}$ per ounce.

Returns from McDougal Works :
Average fineness, .795—equal to \$16.45 $\frac{43}{100}$ per ounce.

Return of bullion :	
5,601.73 ounces, at \$17.45 $\frac{92}{100}$	\$9, 7801 91
40.27 ounces, at \$20.37 $\frac{50}{100}$	820 50
27.34 ounces, at \$16.45 $\frac{43}{100}$	450 56
1.34 ounces assay chips and grains	23 45
Sulphurets sold.....	1, 445 50
	\$100, 541 92

Weight of bullion before assaying :	
Ounces.....	5, 671. 32

After assaying :	
Face of bars, ounces	5, 669. 34
Assay chips and grains.....	1. 34
Loss.....	. 64
	5, 671. 32

Cost of mining.

Supplies on hand October 1, 1874.....	\$1, 200 00
Paid for supplies and labor during the year....	39, 349 26
	40, 549 26

Deduct :

Supplies on hand September 30, 1875.....	900 00
Merchandise sold during the year.....	21 00
	921 00

Cost of mining 3,985 tons	39, 628 26
Or an average of \$9.94 per ton.	

Cost of milling.

Supplies on hand October 1, 1874.....	\$1, 000 00
Paid for supplies and labor during the year ...	15, 213 56
	16, 213 56

Deduct :

Supplies on hand September 30, 1875.....	1, 100 00
For custom-work done and supplies sold.....	725 15
	1, 825 15

Cost of milling 4,310 tons	14, 388 41
Or an average of \$3.24 per ton.	

Cost of concentrating sulphurets.

Number of tons concentrated during the year.....	27 $\frac{1}{2}$ tons
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Cost of concentrating :

Labor, as per pay-rolls	\$1, 042 00
Or an average of \$38.34 per ton.	

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Statement of receipts and disbursements for the year ending September 30, 1875.

RECEIPTS.

From bullion	\$100,091 36	
Amount of sulphurets belonging to last year.....	700 00	
		\$99,391 36
From sulphurets on hand.....		200 00
From other receipts.....		6,366 77
		<u>105,958 13</u>

DISBURSEMENTS.

Supplies on hand October 1, 1874.....	\$2,806 37	
Paid to I. T. McDougal.....	800 00	
Paid for supplies and labor during the year, (in- cluding \$43,667.50 paid for prospecting or dead-work)	120,272 03	
Paid all other expenses.....	6,551 89	
	<u>130,430 29</u>	
Off for supplies on hand September 30, 1875....	2,792 22	
		<u>127,638 07</u>
Amount of disbursements over receipts		21,679 94

STATEMENT OF BALANCE.

On hand October 1, 1874:		
Balance cash.....	\$98,140 36	
Balance of supplies and sulphurets.....	3,506 37	
		<u>101,646 73</u>
On hand September 30, 1875:		
Balance cash.....	\$76,974 57	
Balance of supplies and sulphurets.....	2,992 22	
		<u>79,966 79</u>
Amount of former balance of cash, sulphurets and supplies reduced during the year		21,679 94

Statement showing the receipts and disbursements of the company from the date of its going into operation, October 1, 1865, to date.

RECEIPTS.

By bullion taken out.....	\$4,373,239 85	
By other receipts	41,757 15	
	<u></u>	\$4,414,997 00

DISBURSEMENTS.

To sundry titles; to paid on the purchase of mine; for Whiting ground or square location; purchase of Mobile and Roannaise Mines and perfecting titles.	\$302, 706 50
To construction	158, 383 71
To dividends	2, 054, 000 00
To mining, milling, and all other expenses.	1, 819, 940 00
	4, 335, 030 21

On hand September 30, 1875:

Balance of cash	\$76, 974 57	
Balance of supplies	2, 992 22	
	79, 966 79	
		\$4, 414, 997 00

Statement of profits from October 1, 1865, to September 30, 1875.

RECEIPTS.

From bullion	\$4, 373, 239 85
From other receipts	41, 757 15
	\$4, 414, 997 00

COST OF SAME.

Paid for mining, milling, and all other expenses	1, 819, 940 00
Net profits	
	2, 595, 057 00

DISTRIBUTION OF PROFITS.

Paid for sundry titles	\$302, 706 50
Paid for construction	158, 383 71
Paid for dividends, \$102.70 per share	2, 054, 000 00
	2, 515, 090 21
Balance of cash	\$76, 974 57
Balance of supplies	2, 992 22
	79, 966 79
	\$2, 595, 057 00

The superintendent, Mr. William Watt, says:

In Eureka Mine proper we have driven 196 feet of drifts, 879 feet of cross-cuts, and sunk 34 feet of winze; have also sunk 71 feet of shaft on the Roannaise, and 22 feet of shaft and driven 611 feet of drifts in Eureka No. 2.

We have hoisted 4,235 tons of quartz, and crushed 4,310 tons in 214 running days, with 10 stamps, averaging a little over 2 tons per day to each stamp.

We have concentrated 27½ tons of sulphurets and worked 39½ tons, and have now on hand 4½ tons, which I value at \$200 net.

There are 250 tons of quartz on the surface and 100 broke in the mine ready for hoisting.

The amount of quartz extracted during the past year from the various levels has been as follows:

	Tons.
From the fourth level	169
From the fifth level	539
From the sixth level	3, 402
From the Eureka No. 2	125
Making a total of	
	4, 235

There are upward of 900 tons of ore in sight, which will pay a small profit.

I regret not being able to give a more favorable report of our last year's workings, and the immense amount of prospecting that has been done, and the large amount of money expended without making any favorable developments, make me feel solicitous about the future prospects of the company. There are still three places worthy of a further prospect, viz: The twelfth level, the Roannaise from No. 3 shaft, and the Morehouse claim. The mill, hoisting and pumping machinery, although getting old, are in fair working-order.

The Morehouse claim, of which mention has been made by the superintendent, is located south of and cuts the Eureka ledge at right angles, comprises 1,800 feet in length, and is covered by a United States patent, which includes 12 acres of surface-ground. The explorations in the Eureka would seem to indicate a probability of the ledge having turned south across Wolf Creek into the Morehouse ground, instead of continuing west through the Roannaise ground. The trustees of the Eureka have secured the Morehouse claim on the following terms: When the Eureka Company shall have expended \$10,000 in prospecting their ledge, the Morehouse Company will deed to the Eureka Company one-half of the claim. It is further agreed that the Eureka Company have the right to stop work at any time they wish to do so, and to remove any machinery they may have on the claim.

Eureka No. 2 is a ledge east and parallel with the original ledge. Shaft No. 3 is on the Roannaise ground, farther to the east than any previous prospectings.

The Idaho Mine of Grass Valley has for several years been considered the leading quartz-mine of the State. This mine is situated one mile east of Grass Valley, in a contact-formation of slate and greenstone. The president and superintendent, Mr. Edward Coleman, in his annual report for the year ending December 20, 1875, says:

During the year just ended but little has occurred worthy of special notice. You will observe that the pumping-machinery is all complete to the 700 level; and as this is the full depth we expect to require the large pumps, we may consider our expenditures in this connection are met, and no further outlay will be required for several years; also, you will notice the main shaft is completed to the 900 level, and no work has been done below that point.

In view of the large amount of lumber in the mill and hoisting buildings, and the close proximity of those buildings to the pumping-machinery, it was deemed advisable to erect a fire-proof building over the pump-shaft and machinery, in order to secure that most important part of the works against fire and add to the safety of the underground workmen. The building is approaching completion, and but little further expenditure will be required to finish it in all its parts.

In regard to the under-ground work, the drifts have been kept well ahead of the stopes, and the mine may be considered in good working order throughout.

The 500 east backs are worked through to the 400 level, a distance of 144 feet from the shaft, and there still remain about 300 feet in the bottom of the 400 level to work out. The 500 east level is in 371 feet from the shaft, and there still remain about 225 feet to go before exhausting the pay-shoot. The 600 east backs are about all worked out, and a few months more, with a small party of men, will entirely exhaust them. The 600 west backs are also entirely exhausted. The 600 east level is in 1,344 feet from the shaft, the last 555 of which have been either through worthless quartz or barren ground. As this drift is in farther from the shaft than any other, and as there is still a distance of 1,257 feet to our eastern boundary, it is thought best to continue this drift on as fast as possible, with the view of prospecting that part of the claim. The 700 west backs are all worked out, with the exception of a small piece next to the western boundary. The 700 east level is in 712 feet from the shaft, and is still in pay rock; and the backs are worked through to the 600 level 375 feet from the shaft, and there are still remaining about 394 feet to work out in the bottom of the 600 before exhausting the pay-shoot. The 800 west level is in 356 feet from the shaft, the last 150 feet of which have been in rather a small ledge and low-grade ore, and the backs are worked through to the 700 level 35 feet from the shaft. The 800 east level is in 388 feet from the shaft. The ledge is quite large the full length, and the backs also are in a good-sized ledge. It is not worked through to the 700 level at any point.

The ledge in the shaft is of good quality and well defined from the 800 down to about 60 feet below that level. The hanging-wall then goes down very flat and the ledge becomes broken up and makes into several stringers. The shaft was continued

down on the same angle as before, $51\frac{1}{2}$ degrees, and after sinking 120 feet from the 800 level a cross-cut was run in, and after drifting 59 feet the hanging-wall was struck, but no quartz was discovered. A drift was then run east on one of the stringers. It is now in 137 feet from the shaft, with a good-sized ledge in the last 10 feet; but it is not next to the hanging-wall, and the quartz is of a low grade, although showing some gold, and we have good reason to hope it will improve as it is continued east.

In looking over this statement, it will be observed we have a large amount of quartz in sight, but not broken; and as the 700, 800, and 900 levels are still in pay-rock, it is impossible to give an opinion as to the amount of pay-rock we may expect to take from the mine, but I have no doubt it will last for several years.

It will also be noticed that the yield per ton has not been so large; neither have the dividends amounted to so much as in previous years. As to the future, it is dangerous to express an opinion; still I am in hope we shall divide as much in the coming year as we did in the past, although the present yield gives but little margin, and any further falling off would be a reduction of dividends.

During the year we have crushed $28,103\frac{1}{2}$ tons of rock, of which $6,828\frac{1}{2}$ tons came from the 500 level, 2,096 tons from the 600 level, $10,554\frac{1}{2}$ tons from the 700 level, $8,485\frac{1}{2}$ tons from the 800 level, and $139\frac{1}{2}$ tons from the shaft and 900 level.

This gives a total yield of—

27,318 $\frac{1}{2}$ ounces bullion.....	\$478, 073 35
147 tons sulphurets.....	8, 936 44
Tailings.....	7, 946 89
Specimens.....	112 50
Old copper plate.....	600 42
	495, 669 30

Yielding \$17.63 $\frac{1}{2}$ per ton.

MILL AND MINING.

Surface-labor.....	\$45, 345 63
Under-ground labor.....	144, 186 89
Wood and poles.....	24, 829 60
Hardware.....	4, 646 16
Drill-steel.....	1, 787 90
Powder and fuse.....	6, 454 05
Candles and oil.....	4, 503 76
Lumber.....	2, 146 08
Foundry.....	8, 023 89
Coal.....	1, 960 01
Quicksilver.....	1, 932 87
Superintendent's salary.....	6, 000 00
Sundries.....	3, 027 82
	254, 853 66

Costing on an average \$9.06 $\frac{1}{2}$ per ton.

SAVING SULPHURETS.

Labor.....	\$2, 781 00
Repairs and sundries.....	75 00
Paid chlorination-works for reducing 147 tons of sulphurets.....	3, 675 00
	6, 531 00
Grinding sand on percentage, wood, and sundries.....	965 00
Foundry.....	246 00
	1, 211 00

COMPLETING MAIN SHAFT TO 900 LEVEL.

Labor.....	\$7, 236 23
Candles and oil.....	299 37
Powder and fuse.....	28 75
Hardware.....	49 00
Lumber.....	449 72
Wood and sundries.....	475 00
	8, 538 07

82 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Completing pump-machinery	\$7,604 94
New brick pump-house	1,995 98
General expenses.....	19,913 33

RECAPITULATION.

Mill and mining	\$254,853 66
Sulphurets-account	6,531 00
Grinding sand.....	1,211 00
Completing main shaft	8,538 07
Completing pump.....	7,604 94
New brick pump-house	1,995 98
General expenses.....	19,913 33
Total expense for year.....	300,647 98

I make the following extracts from the report of the secretary, Mr. George W. Hill :

At the commencement of the fiscal year now closed, to wit, the 7th day of December, 1874, there was a balance in the treasury amounting to the sum of \$16,505.44. The monthly receipts of the company from all sources for the fiscal year ending December 6, 1875, are as follows, to wit:

Receipts from all sources for—

December, 1874.....	\$39,471 24
January, 1875.....	45,158 57
February, 1875.....	45,208 11
March, 1875.....	40,792 19
April, 1875.....	37,542 28
May, 1875.....	44,823 94
June, 1875.....	33,279 45
July, 1875.....	34,884 88
August, 1875.....	45,992 07
September, 1875.....	40,884 75
October, 1875.....	36,829 56
November, 1875.....	48,058 24

Total receipts for the fiscal year ending December 6, 1875	492,925 28
To which add balance on hand December 6, 1874.....	16,505 44

Total receipts for the year	509,430 72
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The monthly expenditures of the company for the period above, for all purposes, amount as follows, to wit:

Expenses for—

December, 1874, with dividend 66.....	\$50,927 98
January, 1875, with dividend 67.....	40,051 41
February, 1875, with dividend 68.....	43,753 12
March, 1875, with dividend 69.....	39,176 04
April, 1875, with dividend 70.....	37,832 41
May, 1875, with dividend 71.....	42,876 87
June, 1875, with dividend 72.....	39,585 61
July, 1875, with dividend 73.....	37,799 92
August, 1875, with dividend 74.....	40,820 38
September, 1875, with dividend 75.....	42,276 35
October and November, 1875, with dividend 76	90,094 57

Total expenses, including dividends for the year	505,194 66
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Assets brought forward.....	509,430 72
	505,194 66

Balance in treasury, December 6, 1875.....	4,236 06
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In the foregoing monthly expenditures are included eleven dividends, declared by the board of trustees for the year herein stated, and at the times and amounts as follows, to wit:

No.	Dividend declared.	Per cent.	Amount.
66	January 4, 1875	5	\$15,500
67	February 1, 1875	5	15,500
68	March 1, 1875	7½	23,250
69	April 5, 1875	5	15,500
70	May 3, 1875	5	15,500
71	June 7, 1875	5	15,500
72	July 5, 1875	5	15,500
73	August 2, 1875	5	15,500
74	September 9, 1875	5	15,500
75	October 4, 1875	5	15,500
76	November passed		
	December 6, 1875	3	9,300
Being for the year 55½ per cent. on the capital stock, amounting to...			172,050

The secretary presents in epitomized form the aggregate receipts and expenditures of the company for the last seven fiscal years, that being the period in which the mine has paid dividends, and before which only prospecting was done.

Receipts from all sources for the fiscal years—		
1869		\$306,038 75
1870		183,450 23
1871		407,301 16
1872		404,035 52
1873		1,010,612 20
1874		669,023 03
1875		492,919 27

Total receipts for seven years..... 3,473,380 16

There has been paid out in dividends as follows:

1869, 11 dividends, aggregating 55 per cent	\$170,500
1870, 7 dividends, aggregating 12 per cent	37,200
1871, 12 dividends, aggregating 75 per cent	232,500
1872, 11 dividends, aggregating 52½ per cent	162,750
1873, 12 dividends, aggregating 220 per cent	682,000
1874, 12 dividends, aggregating 102½ per cent	317,750
1875, 11 dividends, aggregating 55½ per cent	172,050

Being 76 dividends, aggregating 572½ per cent. on the capital stock, amounts to..... 1,774,750

Mr. John C. Coleman, the treasurer, presents the following statement for the year ending December 20, 1875:

RECEIPTS.

Cash on hand December 21, 1874	\$16,505 45
From 27,318 ⁴⁸ / ₁₀₀ ounces of bullion	478,073 35
From 438 ¹⁶ / ₁₀₀ ounces of sulphurets	8,936 14
Percentage from tailings	3,725 36
Pan-rent	1,106 00
From old copper plates	600 42
From specimens sold	112 50
From sale of old material	132 50
From water-rent	233 00
Total receipts	509,424 72

DISBURSEMENTS.

Paid superintendent's check	300,647 98
Paid dividends	172,050 00
Total disbursements	472,697 98
Due from Thomas Findley	32,490 68
	505,188 66
Cash on hand	4,236 06

The Empire Mine, located on Ophir Hill, one mile east of Grass Valley, was discovered in 1850, and has been worked from that period to the present time with almost uninterrupted success. It is situated in a greenstone formation; course, north and south; dip, about 30° west. Up to 1865 its product has been estimated at \$1,500,000, and the average yield at \$30 per ton. From that time to October, 1868, it produced \$100,000, the ore running \$29 per ton. Cost of mining and milling, \$18.25. Since that time the cost of milling and mining has been materially reduced and the production maintained. The records of the mine were destroyed by fire in 1870, and the product of the mine was not reported until 1873, in which year 8,000 tons were crushed, yielding \$240,000, or a net profit of about \$16 per ton. The ledge is about fifteen inches in width, and has been explored for a distance of 1,800 feet and to the depth of 1,200 feet. The Empire is in all respects a model mine in the economy of its management, and the skill displayed in its underground workings. Returns for the year will be found in the tabulated statements.

The Howard Hill, the Omaha, and the Ford, the latter an extension of the Allison ranch, have been started during the present year, under favorable conditions. The Howard Hill has attained a depth of 400 feet. The third level has been run horizontally about 180 feet, showing at some points a 5-foot ledge. The company's mill, of fifteen stamps, was started in July, 1875, but has since been closed. The Ford or Jennings claim has been tested by several crushings, which yielded about \$100 per ton, but it is to be presumed this is higher than the average. The returns from the Omaha will be found in the tabulated statement. Upon the whole the condition of quartz-mining at Grass Valley may be said to be very prosperous.

In the vicinity of Nevada City are found ten or twelve ledges in the granite formation, but, with one or two exceptions, quartz-mining has not been profitably pursued for several years, owing to the refractory nature of the ores in depth. Professor Silliman, in his notes on quartz-mining in Nevada County, (and his remarks are applicable to other portions of the State,) says:

In quartz-veins containing a considerable amount of sulphurets, it is evident that the outcroppings should offer much better returns to mining-industry than will follow after the line of atmospheric decomposition has been passed, because above this line nature has set free the gold formerly entangled in the sulphurets, leaving it available for the common modes of treatment, with the added advantage oftentimes that the particles of free gold formerly distributed through a considerable section of the vein are found concentrated in a limited amount of ore. It is easy to reach the conclusion in such cases that the tenor of gold in the vein is less in depth, after the real average tenor is reached, while in fact it is neither greater nor less; but the metal is no longer available by common methods of treatment.

This difficulty in the treatment of sulphureted ores has to a great extent paralyzed the quartz-mining industry of Nevada City, but great hopes are entertained of a revival of the long-neglected quartz-mining interest of this vicinity, through an invention or process discovered by Mr. Robert M. Fryer, who has extensive works in operation between

Grass Valley and Nevada City, in which the most refractory ores are claimed to have been successfully and economically treated. I have made some remarks upon this process elsewhere in the present report.

The leading mine of the district is the Providence, situated on Deer Creek, near the point of contact between slate and granite. This mine is now owned by Messrs. Hunter, Walrath, and others. Mr. R. C. Walrath furnishes the following statements. It will be noticed that the bullion-product is not given. It probably exceeded \$150,000.

Providence mine, Nevada district: Length of location, 3,100 feet; course, northeast and southwest; dip 45° southeast; country-rock, slate, and granite; vein-matter, quartz carrying free-gold and abundant sulphurets; cost of hoisting and pumping machinery, \$30,000; greatest depth attained, 820 feet; greatest length of horizontal exploration, 700 feet; eight levels opened. Mill, water and steam power; 20 stamps, (750 lbs., dropping 11 inches 72 times per minute;) 1 pan; 4 concentrators; 2 buddles; capacity, 40 tons per 24 hours; cost of mill, \$20,000; cost of mining and milling, \$2.60 per ton. Sulphurets are treated by chlorination. Number of tons crushed during the year, 10,000.

Mr. Shoemaker, of the Grass Valley Union, says of the condition of this mine in October, 1875:

The incline-shaft is down 800 feet. On this level the drift south has been run 70 feet. On the 700-foot level the drift is in 260 feet, and the ledge is 8 feet wide. On the 600-foot level the drift is in 500 feet, and the ledge 4 feet thick. On the 500 and 400 foot levels the drifts are in 245 feet; on the 300 foot 170 feet has been drifted. On the 200-foot level 259 feet, and on the 100-foot 400 feet have been drifted. The winze on the 700-foot level is down 50 feet. The 600 and 700 foot levels are connected by a winze, which is 175 feet south of the incline. The winze on the 500 and 600 foot levels are 345 from the incline. In short, the ledge for a depth of 800 feet on the south side is ready for stoping, and for a distance of 500 feet, the point now reached with the longest drift, the rock is the best ever found in the mine. The ledge averages about 6 feet in thickness, and much of it is composed of fully 90 per cent. base metal. Professor Price, who recently visited the mine, thought, judging by the weight of ordinary rock, that there are about 25,000 tons of rock ready for stoping in sight. Most of the ledge on the south side is so heavily charged with mineral that it is as heavy as lead. It will take at least two years to work out what rock is in sight without any more dead-work. Mr. Fryer has made tests of some of the ore, and obtained at the rate of \$339.50 per ton. A quantity was also worked by mill and chlorination process at the mine, and \$225 per ton was the result. The dead-work has been going on so as to open up all this body of ore for work by the Fryer process. There has been none of it disturbed except what was necessary to be taken out in running the drifts and winzees. In running the drift on the 600-foot level there were 120 tons taken out in one week by eight men. The foreman thinks one man can take out from three to four tons a day when stoping is commenced.

The rock in the California Mine, on the south side of Deer Creek, in the granite formation, is paying well. That part of the ledge on the north side of the creek known as the Gold tunnel will soon be ready to be worked through the new incline. The shaft will be 600 feet from the present one, which is on the banks of the creek. It is 600 feet deep. The hoisting-works will then be moved there as soon as possible. The mine has been worked at that point before, and rich rock was taken out. It is expected it will continue to afford better rock than has been found south of it. The shaft is a very fine piece of work. The mill will be left where it is now, so as to be run with water until next spring, when it will be removed up to the new shaft and be run with steam.

The Wyoming and Pittsburgh are worked on tribute, and the Murchie is temporarily closed. The Gold Run is prospecting new ground, and several other mines of former note are closed indefinitely and works dismantled.

Among the noted mines of the county, now closed, are the Pittsburgh, Pennsylvania, and Erie, all of which have been described by Mr. James D. Hague, M. E., of San Francisco. His reports on these properties

will be found in my report for 1872, pp. 128-301, and report for 1873, pp. 37-40. But little work has been done on these mines since the dates of Mr. Hague's reports, and they remain substantially in the same condition.

Eureka district is situated twenty miles east of Nevada and Grass Valley, at an elevation above sea-level of 4,600 feet. We find here three systems of quartz-veins: one in the granite; another in the slate; and the third at or near the point of contact of these formations. The ledges in slate are of great width, much broken, and of low grade, but it is apparent that many of them can be worked with profit by the use of water-power, of which this district has an ample supply, being situated near the head of supply of the great mining-ditches of the country. The conformation of the country is such as to permit the opening of this class of ledges by tunnels, and the cheap extraction of ore. Where the ledges occur in the granite formation the hardness of the wall-rock has proved an obstacle to successful mining.

The following is a brief statement of the condition of quartz-mining in this district:

Jim Mine. Depth, 200 feet; 5-stamp mill; yielded \$14 per ton. Closed for past year.

Golden Age. Depth, 100 feet. Closed for five years.

Commercial. Depth, 100 feet. Mill destroyed by fire. Closed for five years past. Yield was \$8 to \$10 per ton.

Birchville. Depth, 250 feet; 5-stamp mill. Rock on bottom did not pay. Closed three years.

Iowa. Depth, 200 feet. Poor on bottom. Mill removed. Closed fourteen years.

Sweet's Mine. Depth, 280 feet. Mine had a good record. Quartz yielded \$28 per ton for several years. Mill removed and mine closed.

Black & Young Mine. Temporarily closed. Ten-stamp mill. Rock yielded \$10 to \$15 per ton.

California. Working. See returns elsewhere.

It seems that in most cases there was an impoverishment of rock as depth was attained; and also that the milling-process was not well adapted to saving the gold when the rock was rich. The mass of tailings below the site of Sweet's Mill assays so high as to show great loss in milling; nevertheless, the mill obtained \$28 per ton.

Meadow Lake district is situated in the high Sierra, about thirty miles east of Nevada, at an altitude of 9,000 to 10,000 feet above sea-level. In 1865 this district was the scene of a great quartz excitement. Locations to the extent of 65,600 feet were made during the year, and during that and the next year seven quartz-mills were built, aggregating sixty-two stamps. A town of from 400 to 500 houses arose as if by magic, and as quickly disappeared. According to Mr. Skidmore, who was among the earliest in the district, no crushing paid a profit on milling and mining. The reason was not in the absence of the precious metals but in the refractory nature of the rock, the gold being combined with sulphurets to such an extent as to defeat all attempts at amalgamation. In one instance the clean-up of the first run was \$4 per ton instead of \$40 to \$60 as was anticipated from assays. The ores contained iron-pyrites, arsenical pyrites, and galena. The formation is granite. The heavy snows falling during the winter season in this region must greatly restrict mining-operations, even should the long-looked-for process be discovered which will unlock the hidden wealth of Meadow Lake. During the past year the Fryer Works, of Grass Valley, have successfully treated ores from this district, and most of the old claims have been relocated and will be opened in 1876.

Description of leading quartz-mines in Nevada County, California, 1875.

[Reported by W. A. Skidmore, J. L. Holland, J. Barry, and J. F. Bockett.]

Name of mine.	Owners.	District.	Length of location.	Course.	Dip.	Length of pay-zone.	Average width.	Country-rock.	Vein-matter.	Cost of hoisting and pumping machinery.	Greatest depth attained.	Greatest length horizontal exploration.	Number levels opened.	Length of adit.	Cost of adit.
Idaho	Company	Grass Valley ..	Feet. 1,112	N. W.	70° S. W.	Feet. Unknown.	7	Greenstones and slate.	Quartz.....	\$30,000	Feet. 500	Feet. 500	2	Feet. .....	.....
New York Hill ..	do	do	900	N. W.	35° N. E.	500	8	Greenstone	do	35,000	250	1,000	3	916	\$10,000
Eureka	do	do	3,604	N. W.	70° S. W.	.....	.....	Greenstone and slate.	do	24,000	1,300	.....	10	.....	.....
Empire	do	do	2,800	N.	95° W.	Variable	1.5	do	do	20,000	1,300	1,800	12	.....	.....
Pittsburgh	Sandford & McCook Brothers.	do	1,500	N.	74° W.	225	0.9	Slate and granite	do	2,000	183	325	3	.....	.....
Antelope	Egan & Co.	do	1,500	N. E.	40° N. W.	100	0.9	Granite and greenstone.	Quartz and other.	200	70	120	1	140	210
California	Company	Nevada	3,000	N.	40° E.	400	1	Granite	Clay, slate, &c.	15,000	480	1,150	3	.....	.....
Gold Tunnel	do	do	3,200	N.	30° E.	500	1.2	do	Clay and quartz.	10,000	425	1,300	3	.....	.....
Nevada	J. S. Van Winkle ..	do	320	N.	E.	.....	5	do	Quartz with pyrites and garnets.	.....	400	2,000	4	1,400	.....
California	McDonald & Lattie ..	Eureka	3,000	N. W.	45° N. E.	200	3	Granite and slate.	Quartz.....	.....	180	500	4	.....	.....

* On incline.

NOTE.—Where the word "Company" occurs in the column of owners, the company bears the same name as the mine. Courses are given in one bearing only, thus: "N. W.," for northwest and southeast; and dips are referred to cardinal points only.

Operations of leading mines in Nevada County, California, 1875.

[Reported by W. A. Skidmore, J. F. Beckett, J. L. Holland.]

Name of mine.	District.	Number of miners.	Miners' wages, per day.	Cost of—					Company or custom mill.	No. of tons extracted and worked.	Average yield, per ton.	Percentage of sulphureta.	Total bullion produced.
				Sinking, per foot.	Drifting, per foot.	Stopping, per ton.	Mining, per ton.	Milling, per ton.					
Idaho.....	Grass Valley.....	.....	\$3 00	\$40 00	\$9 00	\$3 00	\$9 00	\$2 00	Company	28,103	\$17 64	2	\$63,669
New York Hill.....	do.....	60	3 00	30 00	7 00	2 50	13 00	2 25	do	15,000	40 00	5	100,000
Eureka.....	do.....	90	\$2 50 to 3 00	20 00	6 00	4 00	\$8 00 to 9 00	3 34	do	4,310	23 31	2 5	100,542
Empire.....	do.....	8	3 00	10 00	6 00	4 00	5 00	3 00	Custom	11,000	22 00	5	223,000
Pittsburgh.....	do.....	3	3 00	2 50	1 50	3 50	5 00	2 50	do	100	65 00	5	50,000
Antelope.....	do.....	40	2 50 to 3 00	35 00	10 00	5 00	9 00	4 50	do	600	50 00	2 5	85,000
Omaha.....	do.....	20	3 00	15 00	7 00	5 00	5 00	2 00	Company	3,940	19 00	2	90,000
California.....	do.....	15	3 00	15 00	7 00	5 00	5 00	1 75	do	1,000	17 00	3	18,000
Gold Tunnel*.....	do.....	10	3 00	8 00	4 00	3 00	2 50	2 00	do	5,000	10 00	3	.....
Nevada.....	do.....	20	3 00	4 00	3 00	2 00	5 00	2 00	do	2,000	15 00	1	30,000
California.....	Eureka.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NOTE.—The column of bullion-product probably includes proceeds of sulphureta not included in the statement of the mill-yield per ton.—R. W. R.

Statement of quartz-mills, Nevada County, California, 1875.

[Reported by W. A. Skidmore, J. L. Holland, and John Berry.]

Name of mill.	Owners.	District.	Power.	Stamps.				Pans.	Concentrators.	Cost of mill.	Capacity for 24 hours, (tons).	Cost of treatment, per ton.	Tons crushed during year.	Method of treating sulphureta.
				Number.	Weight, in pounds.	Drop, in inches.	Drops per minute.							
Idaho.....	Company.....	Grass Valley.....	Steam.....	35	850	10	70	1	Buddle.	\$40,000	70 to 80	\$2 00	28,103	Chlorination.
New York Hill.....	do.....	do.....	Water and steam.....	19	900	9	80	8	6	90,000	45	2 25	25,000	Do.
Eureka.....	do.....	do.....	Steam (60 horse-power).....	30	850	10	63	2	Buddles.	40,000	60 to 65	3 34	4,310	Do.
Empire.....	do.....	do.....	Steam.....	90	900	9	73	4	10	30,000	40 to 45	2 00	11,000	Chlorination or pans.
California.....	do.....	Nevada.....	do.....	10	750	8	78	.....	.....	7,500	18 to 20	1 75	3,940	Chlorination.
Gold Tunnel.....	do.....	do.....	Water.....	10	750	8	80	.....	.....	8,000	18 to 20	1 75	1,000	Do.
Nevada.....	J. S. Van Winkle.....	do.....	do.....	15	750	9	85	.....	6	20,000	30	2 00	4,000	Do.
California.....	McDonald & Lattie.....	Eureka.....	Steam (40 horse-power).....	10	750	7	78	1	.....	12,000	20	2 00	2,000	None.

* A bout.

The North Bloomfield Company, the works of which are fully described in the report of 1874, pp. 108–114, and in the report for 1875, owns an interest in three distinct corporations.

1st. The Bloomfield property, consisting of the Bloomfield Mine, 1,580 acres, fully equipped and at work, with a tunnel 8,000 feet long, deep enough to bottom all the workable gravel of the claim, and in successful operation; a ditch 41 miles long, with a delivery-capacity of 2,900 inches, and fed in the dry season from storage-reservoirs holding 496 million cubic feet (or 3,710 million gallons) of water. 2d. One-half the property of the Union Gravel-Mining Company. 3d. One-half the property of the Milton Mining and Water Company.

The Manzanita tunnel, of the Milton Company, with accompanying gold-saving apparatus, is in working-order. The French Corral tunnel of this company will probably be completed early in 1876, and the company will then be in the receipt of a large income.

The Milton Company owns five distinct mining-properties, viz: The French Corral Mine, with deep tunnel partly completed; the Kate Hayes and Troy Mine, ($\frac{1}{3}$ interest,) with no tunnel; the Bed-Rock Mine, now in operation, with deep tunnel completed; the Manzanita Mine with deep tunnel completed; the Badger Hill Mine, ($\frac{1}{3}$ interest,) with tunnel yet to be driven to reach the rich gravel.

The Milton Company also owns a main ditch, 60 miles long, from French Corral to the Middle Yuba, which will have a delivery-capacity of 2,500 inches; the Rudyard reservoir to supply this ditch, containing 535 million cubic feet (or 3,980 million gallons) of water; various distributing-ditches aggregating perhaps 18 miles in length; and other water-rights.

The 15-stamp cement-mill on the French Corral claims, owned by the Milton Company, was run in November, 1875, for twenty-two days on cement, and the result of the cleaning up at the end of the run was \$4,550, or an average of \$200 per day. The expense of getting out and milling the cement was about \$50 per day, leaving \$150 per day profit. It is for the purpose of tapping this body of ground that the tunnel is being run at French Corral by the Milton Company. When completed it will allow the whole of the pay-channel, cement and all, to be washed through it. The cement is about 75 feet in thickness, but there has never been over 25 feet in depth worked. It is supposed that the bottom will be much richer than the ground at present worked. The expense of the tunnel, which will be very heavy, is expected to be soon recouped when operations commence.

The following is a memorandum of expenditures made by the North Bloomfield Company, from August 1, 1871, to November 30, 1874:

Bloomfield Mine—Tunnel.....	\$499,000	
Improvements, lands, &c	43,000	\$542,000
Bowman Ditch—Enlargement.....	12,000	
Bowman Reservoir—Dam washed away....	\$12,000	
Present dam, (72 feet).	52,000	
Enlargement to 92 feet.	7,000	
	71,000	
South Lakes—Dams built and surveys.....	7,000	
		90,000
Union Company—Assessments and water.....		50,000
Milton Company—Total cost ditches, &c.....	\$369,000	
Less cost of reservoir.....	31,000	
		338,000

San Francisco—Office and interest.....	\$134, 000
	1, 154, 000
Cost to August 1, 1871.....	725, 000

Total outlay, November 30, 1874..... 1, 879, 000

The following summary shows the financial operations of the company from September 30, 1874, to October 27, 1875, viz:

Receipts.

Assessments paid by stockholders.....	\$282, 310 00	
Profit in mining:		
Bullion-product.....	\$83, 078 63	
Cost of water and mining.....	61, 006 18	
		22, 072 45
Sale of water-right and supplies.....		25, 294 45
		\$329, 676 90

Disbursements.

Bloomfield Mine:		
Tunnel, under-currents, title for		
United States patent, &c	\$25, 731 99	
Mining-supplies increased.....	8, 062 35	
		33, 794 34
Water properties:		
Enlargement of dam, new ditches, and land		
for reservoir-sites		29, 709 07
Union Gold Mining Company:		
Assessments and cost of water...	\$10, 288 40	
Milton Mining and Water Company:		
Ditches constructed.....	39, 378 94	
		49, 667 34
Interest, &c.:		
On bonds and floating debt.....	\$79, 277 39	
San Francisco office expense, and		
salaries manager and secretary.	4, 947 82	
Mining for 1875-'76, &c.....	1, 514 75	
		85, 739 96
Debt:		
Floating debt reduced.....	115, 124 25	
Bills receivable and cash assets		
increased	15, 641 94	
		130, 766 19
		\$329, 676 90

Mr. Hamilton Smith, the general manager of the company, makes the following report, dated November 1, 1875:

From January, 1875, until October 14, ultimo, washing through the deep tunnel of the Bloomfield Mine was prosecuted with but few delays, when mining was suspended in order to allow the cleaning out of the main Bowman ditch. There was in this claim 386,972 24-hour inches * of water, producing \$74,271.77 of bullion, and showing a yield of 19.2 cents per inch. Very much the larger portion of the material washed was white surface-gravel, containing but little gold, and only a comparatively small quantity of the deep blue gravel was mined. The company from 1870 to 1874 used in its old sluices 710,987 24-hour inches of water in washing similar surface-gravel, and the yield per inch was only 13.6 cents; this improvement of the yield for the past season is chiefly due to the increased richness of the lowest gravel thus far worked, and which has largely added to the average of the entire mass of gravel washed. The

* One 24-hour miners' inch is equivalent to 2,230 cubic feet of water.

lowest point yet reached in the claim is still about 40 feet above the bed-rock of the deep channel, and it is in this stratum of 40 feet where the rich pay will be found. The bed-rock will not be reached before next spring, but from that time forward the yield per inch will be greatly increased. At our prospect-shaft No. 1, situate on the same channel, about two-thirds of a mile distance, over 20,000 tons of gravel were drifted, which yielded \$1.53 per ton. Should we be fortunate enough to strike gravel of equal richness at shaft 8, which is the tunnel-opening, the results of the next season's workings cannot fail to be most satisfactory.

The claim at the present moment is looking exceedingly well; the top gravel is unusually free from pipe-clay and bowlders, and the deepest blue gravel thus far reached prospects most promisingly.

The operation of opening up a deep-gravel mine is often attended with great risk and large expense, and we can consider ourselves fortunate in this Bloomfield claim to have so nearly opened the mine to bed-rock in a portion of one season and be able to show a profit of over \$22,000.

The tunnel and all the hydraulic machinery attached to the claim thoroughly answer the purposes for which they were designed, and the mine is now in first-class working-order. Two under-currents and a tail-sludge have been built at the lower end of the tunnel, and these will be increased next year, so soon as it may be found profitable to do so.

The company's water-supply from September 30, 1874, to October 27, 1875, was 600,600 24-hour inches delivered at Bloomfield, and which is a larger quantity than has ever before been received. The ditch increases in size with use, and it is therefore practicable to run more water through it the older it becomes.

For a supply of water during the dry season we rely almost exclusively upon our storage-reservoirs, and these are now of too small a capacity to fill the main ditch the entire season. In 1873 the board of trustees determined to increase the capacity of the Bowman reservoir, and work on the enlargement of the two Bowman dams has been continuously prosecuted up to date. On July 16, 1875, the board decided that these Bowman dams should be built of stone up to the final height of 95 feet, and at an estimated total cost of \$69,000. Up to October 27, 1875, \$22,599.57 had been expended upon this enlargement, and from the present satisfactory condition of the work, I now believe that its entire cost will not exceed \$60,000, being \$9,000 less than the estimate. The work on the dams is being done in a very substantial manner, and it is expected to have them completed to the full height of 95 feet by October, 1876. The reservoir formed by the existing dams, of 72 feet height, holds 453 million cubic feet of water; when completed to 95 feet it will hold 920 million cubic feet, so that this enlargement will double its present storage-capacity. The company will then have a constant supply, averaging about 800,000 24-hour inches of water per annum for its mining-purposes, and which will allow the constant working of its mines through the entire year. The present supply of water averages about 530,000 24-hour inches per annum, and hence the enlargement of the Bowman reservoir will increase our mining-capacity one-half, and add in fully that ratio to the present value of the property. These dams are now the only constructive works of importance which the company has in hand, and when they are completed our construction accounts can be considered as finally closed.

On August 23, 1875, the board of trustees sold to the Nevada Reservoir Ditch Company the second right to our water after it has been used in the Bloomfield and Union Mines, and emptied into the South Yuba River. The consideration of this sale was \$20,000, to be paid in four installments, in 1877-'78-'79-'80, and this amount can be considered clear gain, our company having no further use for the water after its discharge into the river.

Washing in opening the Union Gravel-Mining Company's claim was suspended in May, 1875, the results of mining not having been profitable, owing to the large bodies of pipe-clay encountered in the mine. The Union tunnel is now being extended into the claim for the purpose of prospecting the ground, and by the end of the year the present value of the mine will be definitely determined.

The very extensive works of the Milton Mining and Water Company are now approaching completion, and it is confidently expected that the mines of that company will be largely productive during the coming year.* Its Manzanita Mine is now at last well opened, and affords every promise of becoming an excellent mine. The Bed-

* Bullion-yield from Milton Mining and Water Company's mines, from March 18, 1875, to November 1, 1875:

Manzanita	\$45,974 40	
Last clean-up, say	22,000 00	
		\$67,974 40
French Corral		39,788 91
Bed-Rock		37,331 59
Total for 7½ months		145,094 90

92 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Rock Mine has rich gravel, but is still troubled with surface-boulders. Two large and powerful derricks have been erected to remove these floating stones, and the next season's work ought to show a handsome profit. The French Corral tunnel will be completed by next summer, when I feel confident the clean-ups from this mine will be very large. Most of the surface-gravel in the claim has been washed away, leaving only the lower 20 to 40 feet of the blue gravel, which is exceedingly rich, some of it having milled as high as \$6 per ton. That which is now being crushed at the French Corral mill is yielding \$3 per ton.

The burden of the company's assessments for the past year has been a heavy one to carry, but it must be kept in mind that since January, 1875, when washing through the new tunnel was commenced, all these assessments have been applied solely for the cancellation of the company's debt and accrued interest. Since that date the remittances from the superintendent have considerably more than covered all his expenditures, including the considerable outlay for the work on the Bowman dams and the sluice and under-currents.

Balance-sheet of North Bloomfield Gravel-Mining Company, October 27, 1875.

ASSETS.

Realty at North Bloomfield:		
Cost of mining-claims and improvements	\$150,632 60	
Net cost of prospecting-shafts Nos. 1, 2, 3, and 4	31,606 90	
Cost of Humbug Creek, and improvements	8,394 02	
Cost of main tunnel	493,043 77	
Cost of No. 7 cross-cut, (branch of tunnel)	2,635 27	
		\$666,311 66
Water-properties:		
Ditches—cost of main ditch and distributors, 55 miles	492,106 32	
Reservoirs	170,872 68	
		592,979 00
Milton Mining and Water Company:		
Cost in cash and property of ^{6.126 5} _{12.310} its properties		464,907 00
Union Gravel-Mining Company:		
Cost in cash .. { of ^{4.000} _{8.000} its properties	61,513 13	
Cost in water. {	11,749 79	
		73,262 92
Personal property:		
Quicksilver, mining-tools, &c	7,537 50	
Pipe in diggings, office and engineer's furniture and instruments	20,002 47	
Live stock and wagons, saw-mill, supplies, &c.	5,334 85	
		32,864 52
Operating-accounts, (season 1875-'76):		
Mining-account—expended on account this season's work		2,150 00
San Francisco expenses, (since organization):		
Bills receivable		231,544 70
Cash assets		20,200 00
		5,275 58
Total		2,109,495 58

LIABILITIES.

Stockholders:		
Amount collected by assessments		\$1,377,700 00
Profits:		
Profits from sale Rudyard reservoir	\$67,544 10	
Profits from sale water, season 1872-'73	73,000 00	
Profits from sale water, season 1873-'74	12,592 43	
Profits from sale water to Nevada Reservoir Company	20,000 00	
		\$173,136 53
Less loss on Milton contracts:		
Cost of work done for Milton Company	251,621 27	
Amount received for this	202,000 00	
		49,621 27
		123,515 26
Profit in working Bloomfield mines:		
Yield previous to season 1874-'75	218,073 42	
Yield in season 1874-'75	83,078 63	
Total yield	301,152 05	
Total cost	276,846 76	
Profit previous to 1874-'75	2,232 24	
Profit in season 1874-'75	22,072 42	
		24,305 22
		147,890 55
Floating debt:		
Mortgage:		146,551 31
Proceeds of loan \$500,000 currency		437,423 72
Total		2,109,495 58

Mr. H. C. Perkins, the superintendent, renders the following—

Comparative statement of expenses and yield of the No. 8 mine, season of 1874-'75.

Runs.	Water used.	Time occupied.*	Yield per inch.	Gross yield	Expenses.	Profit.
	<i>Inches.</i>	<i>Days.</i>				
First	61,000	64	\$0 14½	\$8,700 00	\$8,475 00	\$225 00
Second	58,875	46½	15.9	9,360 00	7,850 00	1,510 00
Third†	47,538	92½	21.7	10,300 00	6,150 00	4,150 00
Fourth	54,198	96	15½	8,550 00	5,600 00	2,950 00
Fifth†	59,652	61	20.4	12,150 00	11,150 00	1,000 00
Sixth†	52,134	33	22.4	12,900 00	6,900 00	5,300 00
Seventh§	53,575	35	24.4	13,011 77	6,963 83	6,047 94
Total	386,972	295	** 19.3	74,271 77	53,088 83	21,182 94

*"Time occupied" includes every day from the time washing commenced until washing commenced on next run.

† This run washing was chiefly up Hilder Ravine, where bank had very little of top or poorest gravel. During this run the timbers and blocks were washed out of shaft 2, causing a delay of over three weeks and an extra expense of, say, \$3,000.

§ The clean-up for this run was \$15,038.06; expenses, \$6,963.83; showing a profit of \$8,074.23. As, however, this clean-up was a final one, all the sluices being cleaned, a portion of it properly belongs to the preceding runs, and has been credited to them in above statement for the purpose of making an exact comparison.

‡ Inches for 24 hours.

† From December 21, 1874, to October 11, 1875.

** Average.

Mining and water cost and yield.

	Labor.	Supplies and tools.	General expense.	Total costs, water and mining.	Bullion-products.	Yield per inch of water.	Net profit.
No. 8 Mine.....	\$23,790 39	\$12,489 09	\$3,328 95	\$53,088 83	\$74,271 77	\$0 19.2	\$21,182 94
Woodward Mine	1,929 00	625 00	250 00	4,788 00	6,011 60	11.7	1,225 60
Eisenbeck Mine.....	1,459 75	550 00	100 00	3,088 35	3,725 06	10.4	361 29
Hilder Tunnel.....				45 00	70 20		25 20
Total	26,232 14	13,664 09	3,678 95	61,006 18	83,078 63		22,072 45

The extensive gravel-mining operations of Nevada County have been fully described in former reports, and I shall therefore review only the operations of the past year.

One of the most costly and extensive systems of mining-ditches is that of the Eureka Lake and Yuba Canal Company. The company owns three hundred miles of ditch, supplying 6,000 inches of water. Their mining-ground and improvements cost \$1,500,000. The main canal commences near the summit of the Sierra Nevada Mountains, and follows the ridge to North San Juan, a distance of about sixty-five miles. This ditch receives its water from several reservoirs, the principal ones being Eureka Lake and Lake Faucherie. They will supply about 3,000 inches of water all winter and during five or six months of the dry season. The ditch is about 8 feet wide, and over 3 feet deep. The company also owns the Miners' Ditch, which is about twenty-six miles in length, and will supply over 700 inches of water; the Middle Yuba Canal, which is over forty miles long and has a capacity of 1,500 inches of water; the Poorman's Creek Ditch, which is twenty-two miles long, with a capacity of over 300 inches; the Grizzly ditches, the Spring Creek ditches, and several others. They were built by different companies, but in 1865 were consolidated, and became the property of the present company, which has a perpetual right to all this water, and a section of over two hundred square miles of rich mining-ground to

supply. The company has usually sold all its water to mine-owners, but during the past two years rich mining-ground has been secured sufficient to use all the supply afforded. At Relief Hill the company has a large claim, which has been successfully worked for years. At North Bloomfield, adjoining the North Bloomfield Hydraulic Mine, and on the same channel, it owns 700 acres. At Moore's Flat, one of the proprietors, Marks Zellerback, owns some rich and extensive mines, but the most valuable ground owned by the company is at Columbia Hill. The ground is located on the same channel as the North Bloomfield Mine. The ground, from the surface down, pays largely, and there is enough of it to last fifty years. There are in the claim about 1,500 acres. It extends on the line of the channel a distance of two and one-half miles, and is from one-fourth of a mile to a mile in width. The depth to bed-rock averages from 150 to 400 feet, and as far down as it has been washed there is not a particle of pipe-clay or hardly a rock to make it expensive working. On the east end of the claim there has been perhaps a hundred acres of the ground worked to a depth of about 75 feet, when work was suspended for want of fall.

A tunnel has been commenced which will run into the western portion of the mine known as the Central and Western claims, which will allow them to be worked to a depth of 200 feet. It is now completed a distance of 900 feet, and it will have to be run 1,250 feet farther before finished. It is being run at a rate of 125 feet a month; so it will all be completed in ten months. A flume has been constructed from Spring Creek into the eastern portion of the ground, which is 4,600 feet long, 8 feet wide, and about 20 inches high. It will allow the eastern half of the mine to be worked to a depth of 150 feet below the present grade, or when it reaches new ground to a depth of 225 feet. The banks are composed of fine gravel, without any pipe clay.

The Nevada Transcript gives the following account of two prominent districts:

Moore's Flat, in Eureka Township, is situated on a bench on the side of the hill south of the Yuba River. It is two miles from the old town of Orleans and one mile from Woolsey's. A gravel-channel follows the bend of the hill, and it has been extensively worked since 1851. The mines at Orleans Flat were long since worked out and the town abandoned, only three or four cabins still remaining to mark the site. Large quantities of gold have been taken out at Moore's, and several good mines are still working, but the place is not as prosperous as it once was. The channel is covered in many places with earth (generally cement) to a depth of 250 feet. In order to work to the bottom of the channel, it is necessary to run tunnels from the hill-side into the mines in order to get a grade. In most cases these tunnels have not been low enough to reach the bottom of the channel; hence, after long and expensive work, owners have found that but about half of the pay-gravel could be washed. Latterly those who commenced a tunnel went far enough down the hill to reach a point many feet below the lowest portion of the bed of the channel in their claims. On the north side of the town the Ohio claims are located. Considerable of the ground has been worked to the depth of a hundred feet or more, until there was no grade, since which the claims have been idle. The ground is very rich, and only needs a tunnel 750 feet long to allow of its being worked again.

Adjoining the Ohio are the Chinese claims, owned and worked exclusively by Chinamen. The ground is rich and pays well. They are the only claims near the town which is in grade. Southwest of them is the Illinois Mine. They have been worked for about twenty years, and have always paid, and the ground is still rich and extensive. A tunnel, however, is necessary to get to the bottom of the channel. The Blue Banks Mine is about half a mile south of the Illinois, and is one of the deepest mines on the flat. There is about seventy feet of blue gravel, on top of which is a bank of pipe-clay 150 feet deep. The gravel is very rich, but it is expensive washing it, on account of the clay, which has to be blasted and pounded up so as to allow it to be worked through the flume. The owners of this claim completed a tunnel 1,000 feet in length this season, and have plenty of fall to work all their ground and some of that adjoining if necessary. The channel here is 300 feet wide and about seventy feet deep in the center.

The hydraulic-mining claim known as the American is situated at Manzanita Hill, near North San Juan. The ground is part of a channel extending from French Corral through Birchville, Sweetland, Sebastopol, and North San Juan. Throughout the whole extent, at different points, mining is prosecuted on a scale of great magnitude. The American Mine consists of the ground of what was originally known as the Gold Bluff, the Badger, and the American claims. Work was first commenced on the Gold Bluff about the year 1869. The company drove a tunnel, through which the western portion of the ground is now washed. The gravel was very rich, and paid heavy dividends. Water at that time cost 75 cents an inch. The gravel in the channel was worked out as far as the tunnels would afford fall, but only a part of the ground could be worked through them. Seven years ago a new one was commenced, which will afford an outlet for all the ground owned by the American Company. It will be 4,000 feet long, and will, when it reaches the point where the shaft will be sunk, be 180 feet beneath the bed-rock. Thirty-seven hundred feet of it is now completed, (December, 1875,) leaving only about three hundred feet yet to run. It will cost in the neighborhood of \$172,000. It is expected it will be finished and everything ready for washing in 1876. The dirt and gravel on the unworked ground is about 200 feet deep, and pays from the grass-roots to the bottom. There is about sixty feet of blue gravel on the bottom of the channel that is very rich. The company has ground enough to keep it working for ten or fifteen years. It has been estimated that there has been over two and a half millions of dollars already taken out of these claims, and it is thought as much more still remains untouched. The company has this season added a series of under-currents near the point, where the washings empty into the river. These, taken in connection with what were before in use, make a most extensive and complete system. There are over forty under-currents now in working-order; some of them are thirty feet wide and forty feet long. The last one pays well. The superintendent says that but a very small portion of the gold is saved in the long flume. The company has expended in the building of under-currents this summer over \$7,000, and it is anticipated that this amount will be saved in one run. Operations of late have consisted in washing the rim of the channel or the ground which has been left while working heretofore, and have paid expenses of working and running the new tunnel. The water used is from the Eureka Lake Company's ditch. About 1,400 inches are used daily with three pipes.

YUBA COUNTY.

This county, covering an area of 600 square miles, is situated in the foot-hills east of the Sacramento Valley. The placer-mines of Sucker Flat, Smartsville, and Timbuctoo, among the most productive in the State, were described by Mr. Amos Bowman in the report for 1875.

In respect to quartz-mining, this county has a poor record. From 1860 to 1865, inclusive, seven quartz-mills were erected, with an aggregate of 70 stamps, and at a cost of \$200,000.

In 1870 the product in quartz-mining was only \$10,680. The principal mines, situated near Brownsville, proved financial failures, and after a short run in 1873 were permanently closed.

One of the most extensive hydraulic-mining enterprises of the State is that of the Excelsior Water Company, of Smartsville, which was organized in the early part of the summer of 1875, with a capital stock of \$2,000,000, divided into 20,000 shares of \$100 each, for the purpose of

consolidating various properties in Yuba County, owned by different corporations, but by essentially the same individuals. Among the properties so absorbed may be mentioned the noted Blue Gravel Mine, whose owners were the first in the State to complete a bed-rock tunnel and tap one of the channels of the so-called ancient river-system of California, and which has been paying largely for many years. Also, the Rose Bar Mine, which promises to rival the first-named; also, the large property and perennial water-supply of the Excelsior Canal Company. This company also controls several other mines of local fame and great value. Since its incorporation it has paid nearly \$90,000 in dividends, in addition to spending a large amount in the permanent improvement and extension of its property.

The Smartsville hydraulic mines are worked with energy and profitable results. This deposit of auriferous gravel is about 15,000 feet long and half a mile wide, on the average, while the depth varies from 50 to 350 feet. The bottom of the ancient channel is several hundred feet higher than the channel of the Yuba River, from which it is separated by a rim of bed-rock. This rim is pierced by several tunnels, of an aggregate length of 12,000 to 14,000 feet. These tunnels are from 6 to 8 feet wide and 7 to 9 feet high. The flumes or tail-slucies are about 4 feet wide and 3 feet deep, lined with rock.

Water is supplied by the ditches of the Excelsior Water Company, which also owns or controls the greater portion of the gravel of the district. These ditches aggregate over 110 miles in length, and can deliver during the winter season from 7,000 to 8,000 inches of water. During the summer season the supply falls to 2,500 inches.

Two more tunnels, each about 2,500 feet long, will be required to furnish outlet for the remaining gravel in place. One of these, known as the Deer Creek tunnel, has been run by hand 950 feet. The company has now in operation an Ingersoll drill, by means of which the remaining 1,500 feet will be completed. The rock of this district is exceedingly hard, and the cost of running these tunnels is very high, varying from \$40 to \$50 per foot, with diamond-drills, and compressed air for motive-power. In one instance which came under Mr. Skidmore's observations it required two days with a diamond drill to put in 18 holes four feet deep. This number of holes constitutes the usual blasting-face, but in some instances as many as 36 holes are required. The consequence is that progress is very slow, even with the improved power-drills.

In order to work the rich bottom strata of the Smartsville Consolidated Company and adjoining ground, another tunnel of 2,400 or 2,600 feet will be required. This company has a piece of ground 1,200 feet in length by 800 feet in width. Work on the new tunnel was commenced in December, 1875.

The celebrated Blue Gravel claim, frequently noticed in these reports, is situated in this district. This claim, for many years the leading hydraulic mine of the State, after having been worked as deep as possible through the upper tunnel, suspended dividends for a time, pending the completion of a lower tunnel, 1,760 feet in length and 65 feet lower than the former, and through which the company is now working. The bottom proved extraordinarily rich, and some of the "clean ups" of the present year have exceeded anything in the previous history of the mine. It has yielded about \$2,000,000, a portion of which (bottom gravel only being worked) has been obtained at the rate of \$1,750 per day's washing of eleven hours' run, with 1,200 inches of water.

The Rose Bar claim, from which the top dirt has been entirely stripped, yielded \$600,000 to \$700,000. This claim is about 1,800 feet in

length on the channel, and for most of this distance embraces the entire width of the channel. A lower tunnel 1,100 feet in length has recently been completed and washing commenced. The gravel resembles that of the Blue Gravel Company's ground. The ground on the first run yielded \$800 to every 1,000 inches water on eleven hours' run. This product will be exceeded in future runs, as the best ground is not yet accessible.

In this district about 30,000,000 cubic yards of auriferous gravel have been removed by the hydraulic process, yielding, as shown by records, \$7,000,000, exclusive of \$3,000,000 which was taken out in the early days before the era of deep mining. There are by measurement about 100,000,000 yards in place, which, on a basis of 25 cents per cubic yard—the average product of ground already worked—will yield \$25,000,000. But assuming this to be an overestimate as to the value per cubic yard, and placing the yield at 15 cents per cubic yard for the entire mass of ground in place, we have \$15,000,000 as the probable future product of the district. The average annual product of the district will be about \$500,000 per annum for several years, but on the completion of the great tunnels now in progress this yield will be increased. Under ordinary circumstances it will require about twenty-five years to exhaust this great deposit. The proportion of profit will be about 60 or 65 per cent. of the gross receipts.

BUTTE COUNTY.

This county has ten quartz-mills, but only two are running. About 4,000 or 5,000 tons were crushed in 1875. There are 330 miles of mining-ditch, supplying 8,000 inches of water. The principal hydraulic mining and one of the largest enterprises of the kind in the State is that of the Spring Valley Land and Mining Company, located at Cherokee Flat. This company employed 150 laborers and miners, the usual rate of wages being \$3 per day. It owns between 250 and 300 acres of mining-ground, averaging 100 feet in depth—enough of good paying ground for fifty years to come at the present rate of working. This extensive mine has three openings. There are three miles of triple line of flume, two of which are six feet in width and the other four. They are constructed so as to shut off the water and clean up any portion of either at any time. There are also in connection with the flume twenty-four under-currents, ranging from six feet in width to thirty. The company has nine hydraulic chiefs or giants, the streams from which are forced out under a pressure of 250 feet of water, and they are constructing a ditch which will give them a pressure of 302 feet. These giants under the former pressure with seven-inch nozzle will throw 1,000 inches of water; six-inch nozzle, 700 inches; five-inch nozzle, 500 inches.

The sources of water-supply for this mine are Butte Creek and the branches of Feather River, as well as the water-shed of Table Mountain. Butte Creek and the west branch of Feather River furnish the entire summer supply. The former is 26 miles in length from the head dam at Butte Creek to the extensive reservoir at Concord Valley; the ditch is 5 feet wide on the bottom by 3 feet deep. The ditch, in its course, crosses two streams or deep cañons, by means of iron pipes 30 inches in diameter. The first is 1,064 feet in length, with a maximum depression of 150 feet. The second, crossing the west branch of Feather River, is 3,555 feet in length; maximum depression, 650 feet. It flows into the large reservoir at Concord Valley, which covers 320 acres of land.

The Dewey Ditch takes its water from the head of the west branch, up in the regions of eternal snows, is 18 miles in length, and serves as

feeder for Butte Creek Ditch, into which it empties. From the great Concord reservoir the water is brought 12 miles in a large ditch 6 feet wide on the bottom by 4 feet deep; it again crosses the west branch of Feather River in a pipe of the same diameter as those mentioned—30 inches—but with a maximum depression of 856 feet, which is believed to be the most severe hydraulic strain which engineers have attempted to control in any enterprise of this kind. The pipe is nearly 3 miles in length; the heaviest iron used is three-eighths of an inch. It has a head of 180 feet perpendicular pressure, and its greatest capacity is 2,200 inches by actual measurement, or 37,445,760 gallons every twenty-four hours. This represents the summer supply of the company. In addition to these extensive ditches and reservoirs, they have about 40 miles of ditches ranging from 2 feet wide and 18 inches deep to 10 feet wide and 4 feet deep, which furnish the mines with a vast supply during the winter months, probably increasing the supply to 5,000 inches.

The tailings flowing from the mines have run down the channel of Dry Creek, and during the winter freshets have been washed out over the adjoining lands, and have damaged them to some extent. Hence the company has adopted the policy of purchasing all the ranches through which the creek flows; and it now possesses some 12,000 acres, which have cost \$280,000.

In addition to the product of gold, the mines of Cherokee yield diamonds and platinum. About fifty beautiful diamonds have been found, ranging from about one carat to three and a half. Many have been cut and set as gems. The greater part of the stones possessed at Cherokee were found during the earlier days, when primitive modes of mining were in operation. The present system of hydraulic washing, with its immense streams of water and gravel, flowing away so rapidly, renders a search for precious stones impracticable. But in the black sands which gather in the bottom of sluices, tons of which are shoveled out in the process of cleaning up, may be seen, it is said, with an ordinary magnifying glass, great numbers of perfectly formed diamonds, varying from merest mite to almost a pin-head in size. Platinum is found in considerable quantities, but no effort is made to save it; though it does not amalgamate, it affiliates with the gold amalgam, and is brought in that shape. Small lots have been gathered from time to time. The company has a pound or two in the office.

A full description of the extensive works of this company with details of expenditures will be found in my report of 1874, pages 133-136.

The following is extracted from the annual report of the Spring Valley Canal and Mining Company, for the year ending July 15, 1875:

RECEIPTS AND DISBURSEMENTS.

RECEIPTS.		
Gold bars.....		\$401,599 91
Water-sales.....		73 50
Notes given during the year, (see bills payable).....		76,714 38
Cash on hand July 15, 1874.....		2,079 23
		480,467 02
DISBURSEMENTS.		
Current expenditures.....	\$152,964 91	
Less amount now due on pay-roll.....	1,216 08	
		\$151,748 83
Dividends during year.....		85,000 00
Paid notes to amount of.....		114,056 88
Paid for ranches and on ranch account.....	\$81,010 70	
Less due C. P. R. R. on said purchases.....	7,130 87	
		73,879 83

Claims purchased during the year.....	\$26,205 00
Permanent expense account.....	22,566 69
Quicksilver purchased during the year.....	1,810 20
Paid the amount due on pay-roll July 15, 1874.....	2,155 26
Cash on hand.....	259 74
Paid amount due on current book-account July, 1874.....	997 91
Paid on current book-account additional.....	1,786 68
	480,467 02

ASSETS AND LIABILITIES.

ASSETS.

Property-account July 15, 1874.....	\$4,344,496 68
Less—	
Cash on hand July, 1874.....	\$2,079 23
Ranches on hand July, 1874..	247,490 00
Residue gold account.....	199,629 23
	449,198 46
Balance.....	\$3,895,298 22
Claims purchased during year.....	26,205 00
Permanent improvement:	
Permanent expense-account.....	\$4,105 78
Iron pipe.....	13,010 70
Dewey Ditch improvement.....	5,450 21
	22,566 69
Quicksilver purchased during year.....	1,810 20
Total property-account.....	
	\$3,945,880 11
Ranch-account.....	307,706 09
Ranch expense-account during year.....	14,092 01
Ranch interest-account.....	6,702 60
Total ranch-expenditures to date.....	328,500 70
Due on current account balance.....	1,786 68
	4,276,167 49

LIABILITIES.

Capital stock.....	\$4,000,000 00
Gold bars.....	\$401,599 91
Water-account.....	73 50
Total receipts for the year.....	\$401,673 41
Less current expenses.....	\$22,068 15
Less current labor.....	100,338 52
Less teaming-account.....	2,628 52
Less merchandise-account.....	15,052 29
Less lumber-account.....	3,694 44
Less interest-account.....	3,638 46
Less injury-account.....	326 00
Less litigant-account.....	5,218 52
	152,964 91
Balance of actual profit for the year.....	\$248,708 50
Less dividends.....	85,000 00
	163,708 50
Actual liabilities:	
Bills payable.....	81,314 38
Due C. P. R. R.....	30,188 27
Due on pay-roll.....	\$1,216 08
Less cash on hand.....	259 74
	956 34
Total.....	
	112,458 99
	4,276,167 49

The secretary's report contains the following comments upon these statements:

In the preceding statements, under the head of assets and liabilities, the gold yield for the year aggregates the sum of \$401,599.91. Of this amount \$363.92 was obtained from tailings of the Cherokee Company's flume by a man who worked the ground for one-third the proceeds, and was by him minted through Rideout, Smith & Co., Oroville. The balance came directly from our mine, and was by us refined, run into bars, and shipped to the treasurer, Mr. Judson, San Francisco.

The water sales made during the year have been exclusively for domestic purposes, to parties who have attached to our office pipe.

Our current labor-account for the year has been materially in excess of our last year's report. This is due, in a great measure, to expenditures upon the Eureka and McDonald tunnels, and upon a deep and expensive bed-rock cut excavated last fall to reach the bottom ground on the upper flat. We have also been obliged to make new openings in Saw-mill Ravine, and the work has been through stratas of pipe-clay, which invariably occur upon the rim, incurring an additional expenditure, not only in labor, but also in blasting material, particularly giant powder, as exhibited in the statements. To the latter cause the decreased yield of bullion is also due—the heavy beds of pipe-clay retarding the rapid washing of pay-gravel.

We have purchased during the year about 2,800 pounds of quicksilver, costing, at 64 cents and 65 cents, \$1,810.20. This gives us now on hand and in the sluices 15,862 pounds, or nearly 8 tons. This is arrived at by allowing a loss of 12 per cent. per annum, which we ascertained to be the average waste when it was our custom to shut down the works in the spring.

We hold in Cherokee mining-district 1,210 mining-claims, of 100 feet square each. A portion of these have been worked out, and from those lying in the upper flat the surface has been washed away. No surveys have ever been made to ascertain what proportion of our ground is still untouched. We have about 52 miles of ditch, which conveys water to Cherokee, of an average depth of 3½ feet and 5 feet in width, and 3¼ miles of iron pipe, 30 inches in diameter, conveying said water across the various rivers which intercept the line of the ditch. In the claims we have nine hydraulic giants, to which the water is conveyed, and leading therefrom a triple line of sluices, 6 feet and 4 feet in width, for nearly 2 miles.

The two quartz-mills in operation near Forbestown are using the Paul process, which was noticed in the report of 1872, (pages 37, 38.) As the process has been changed and improved since its introduction in 1871, and is now in use in several counties in this State, I insert the following statement concerning its details. The results of practice so far do not in my judgment indicate that the advantages claimed for it counterbalance the extra cost and difficulty of a dry treatment. I need hardly add that I do not concur in Mr. Paul's electrical theories. His process might be good in spite of them; but it must be judged chiefly on mechanical and economical grounds.

The ore must be dried to the complete expulsion of all dampness and should be worked as soon as taken from the calcining-kiln or drying-plates, whichever parties prefer using. The calcining-kiln serves two purposes, one of drying, the other of softening the ore, allowing more to be reduced with the same expense. For hard ore, Mr. Paul recommends the kiln; for soft ore, the plates. For the crushing of ore, he uses and prefers the common stamp-battery. Any style of machinery, however, is acceptable which reduces the ore to fineness suitable for the pulverizer, say 20, 30, or 40 mesh wire-cloth.

The operation begins by filling a hopper with ore to be worked. The stamps, when in motion, operate on an automatic feeder, connected with the hopper holding the ore, and the battery is thus fed with more certainty and regularity than by hand. The stamps reduce the ore coarsely, say to the fineness of No. 30 wire-cloth. The battery is thus enabled to do double the work ordinarily performed by dry-crushing batteries. The crushed ore falls upon a conveying-belt and is carried to the hopper of the pulverizing-barrel, where it is at once delivered inside. This barrel is self-feeding and self-discharging, and contains, together with partially-reduced ore coming from the battery, from 200 to 500 pounds (according to the size of the barrel) of hard quartz in pieces of the size of a fist. The larger pieces are used as pulverizing-material, the coarser pulverizing the finer, as well as reducing itself by attrition. The ore from the battery is thus rapidly brought to a powder fine enough to pass through No. 80 or 90 wire-cloth, No. 90 having 8,100 openings to the square inch. The internal arrangement of this barrel is such that the ore passes through a series of sieves, only the first dis-

charging outward and into the hopper below. The remaining material is returned at each revolution into the center of the barrel for further reduction. To prevent dust flying about, the barrel is inclosed in a tight case, the lower portion of which forms a hopper. Into this the pulverized ore falls, and by means of a small valve is delivered at the will of the amalgamator into the amalgamating-barrel, which is directly beneath it. Into this fine, dry, warm ore from 15 to 20 per cent. of mercury is introduced, together with some simple chemicals, provided the character of ore requires them. The ore, it is claimed, is now freed of all gases or rebellious films and is in the most favorable condition for amalgamation. The pure, electrical, and warm condition of the ore enlivens the mercury, and by a slow revolution of the barrel the mercury and ore play together like water, effecting the most complete intermixture. All base substances in the ore are thrown into a different electrical condition to the precious, and cannot be taken up by the mercury, neither do they have any "sickening" effect upon the mercury, no matter what the ore contains. The time given for amalgamating varies from 30 to 60 minutes, according to the ore. It is usually only 30. This time having elapsed, the ore is then conveyed by its own gravity into a main settler of special construction, also patented by Mr. Paul. Water is introduced simply for the purpose of separating the sands and mercury, and soon the mercury begins to gather and move through a simple device, also patented by Mr. Paul as an "amalgam safe." In this safe the precious metals are deposited as amalgam, while the surplus mercury passes on and out, again to be used in recharging the amalgamating barrel. Two and sometimes three of these settlers are used, according to the value of ore, fineness of reduction, and the quantity which can be worked by one set of barrels. Practice has shown that this system can be carried out to any desired extent by duplicating ten-ton mills. Seven patents, all held by Mr. Paul, cover the process and machinery. The percentage of extraction is simply a question of expense and profit. The more labor expended in the reduction of material, the higher the percentage obtained. Mr. Paul considers that on ordinary gold-quartz 85 per cent. is the most profitable percentage to work for.

As a general thing, he claims California ores can be worked up to this percentage by his process at an expense of about \$3.50 per ton where steam-power is used, and less if water can be had for power.

Description of leading mines in Butte County, California.

[Reported by H. E. Vall and Charles D. Smyth.]

Name of mine.	Owners.	District.	Length of lead-cannon.	Course.	Dip.	Length of pay-zone.	Average width.	Country-rock.	Vell-matter.	Cost of hoisting machinery.	Greatest depth attained.	Greatest length of horizontal exploration.	No. of levels.
Forbestown Consolidated Mammoth	Company	Oro	Feet. 12,900	S. W. and N. E. E. and W.	N. W.	Feet. 2,000	Feet. 6	Slate Granite ..	Quartz do	\$2,500	Feet. 130	Feet. 3,500	*4 100

* Opened by tunnel: length, 1,210 feet; cost, \$3,600.

† Opened by tunnel: length, 140 feet; cost, \$800.

Operations of leading mines.

Name of mine.	No. of miners employed.	Miners' wages per day.	Sinking, per foot.	Drifting, per foot.	Stoping, per ton.	Mining, per ton extracted.	Milling, per ton.	Tonnes extracted and worked.	Company or custom mill.
Forbestown Consolidated Mammoth	8	\$1 50 to \$3 00	\$12 00 5 00	\$3 00 5 00	\$1 25 1 00	\$1 50 2 50	\$2 00 1 50	.....	Company. Do.

Statement of quartz-mills.

Name of mine.	Owners.	District.	Kind and amount of power.	No. of stamps.	Weight of stamps.	No. of drops per minute.	Height of drop.	No. of pans.	No. of concentrators.	Cost of mill.	Capacity per 24 tons.	Cost of treatment per ton.
Forbestown Consolidated Electric	Company	Oro	Steam, 50 horse-power Water, 2,000 inches...	10 5	Pounds. 750 650	85 85	Inches. 6 7	Paid process* do	2 1	\$16,500 15,000	Tons. 10 10	\$2 50 1 50

* Dry stamping and dry amalgamation.

SIERRA COUNTY.

This county has been fully described in the Reports of 1873 and 1875, both from a personal visit of Mr. Skidmore in 1874, and in an elaborate paper of Mr. Charles Hendel, which will be found in the Report of 1873, pages 77 to 91. The principal industry is gravel-mining, which is here carried on by means of tunnels or drifts, the greater portion of the county being covered by volcanic matter. In the lower part of the county, however, near Brandy City, there are extensive ranges of auriferous gravel which are worked by the hydraulic process. The county has 23 quartz-mills and 223 miles of mining-ditches. The gravel obtained by drifting is stored in large dumps until the washing season, when it is run through long flumes, under light heads of water. The principal mining-towns are Howland Flat, Gibsonville, Newark, (Whiskey Diggings,) Port Wine, Monte Cristo, Forest City, and Alleghany, all lying on the great "Blue lead" which traverses this portion of the State in a northerly and southerly direction.

The most productive mine in the county is the Bald Mountain, near Forest City, which was fully described in the Report of 1875. This claim was prospected by a shaft 280 feet in depth and a tunnel 2,000 feet in length run to connect with the shaft. These works required nearly two years for their completion, and cost \$20,000. The mine has a frontage of 3,600 feet, and a length of $1\frac{1}{2}$ miles, the channel running nearly on the line of longest course. The improvements at the mines are very complete and extensive. The main tunnel is now about 3,500 feet long. The washing-flume is $1\frac{1}{4}$ miles long, 17 inches wide, 18 inches deep, grade 6 inches to 12 feet, paved with blocks, and a larger portion laid with iron riffles. At the lower end of the flume are the tailing-claims of the company, which are 8,000 feet in length. There are two large dump-yards, double planked, of a capacity of 30,000 cubic yards, reservoirs, ditches, and flumes, timber-houses, store-room, and shops, &c.

The Bald Mountain Company commenced operation by sinking a shaft, and at a depth of 268 feet found bed-rock and good pay-gravel. This induced the company in the spring of 1870 to start a tunnel for the shaft, and in April, 1872, the shaft was reached, and drifting commenced. From the first washing enough gold was obtained to pay all expenses of opening the mine. Since that time the mine has paid largely. The following is a summary of operations for three years and a half:

Period.		Car-loads of gravel extracted—1 cubic yard each.	Yield per car-load.	Total yield.	Cost per car-load.	Total expense.	Dividends.	Per cent. of divi- dends to yield.
From—	To—							
April, 1872	July, 1873	50,168	\$2 02	\$131,721	\$1 35	\$77,781	\$54,000	40.9
July, 1873	July, 1874	65,722	2 93	196,572	1 31	86,572	110,000	55.9
July, 1874	July, 1875	79,590	2 70	215,292	1 19	95,292	120,000	55.8
July, 1875	December, 1875			53,009		22,277	30,721	57.9
Total		195,540		596,654		281,922	314,721	52.7

The product of the last six months was obtained by washing one-half of the dirt on hand. In July, 1875, it was reported that the company had worked 539,354 square feet of the bed-rock of its claim, and had over 6,500,000 square feet remaining, estimated to yield (at the rate of

experience to that time) about \$1 per foot. The gold is coarse; the largest piece taken out weighed 65 ounces.

I am indebted to Mr. Charles W. Hendel, mining engineer, and United States deputy mineral-surveyor, for interesting information concerning the leading quartz-mines of this county. Besides the often-cited causes of failure in quartz-mining, it is worthy of mention in this instance that those mines which have been worked by associations of private owners, not incorporated, have been less profitable than those worked by companies. This is due to the frequency of disputes concerning the management, leading either to the stoppage of work or to ruinous changes and fluctuations in the administration.

In the southern part of this county, about 10 to 11 miles east of south from Downieville, on Wolf Creek, a tributary of the Middle Fork, we find the Independent and Franco-American quartz-lodes, prominent on account of their large and well-defined croppings. The quartz-rock of the first named, and most developed, was worked by the locators in arrastras as early as 1866. In 1868 they built, at a cost of \$6,500, a mill of 12 stamps capacity, containing 2 batteries of 4 stamps each, of 650 pounds weight, having a speed of 70 drops per minute and 8 inches fall. The mill has a crushing capacity of 8 tons in 24 hours; is driven by an overshot water-wheel 20 feet in diameter. The quartz is hoisted in large barrels out of the shaft, and the water is pumped by means of a 6-inch double-acting Hooker pump, all being driven by a 25-foot diameter overshot water-wheel. Pumping and hoisting apparatus cost \$2,700. The water to drive both wheels for all kinds of machinery in and around the mine and mill is conducted in a flume 16 inches deep by 18 inches wide, $\frac{1}{4}$ mile in length, from Wolf Creek, at a cost of \$600. The ledge runs S. 16° 30' east by true meridian. The company owns 1,600 linear feet, for which it has obtained a United States patent. The vein is nearly vertical, dipping about 82° east, and has an average width of 5 to 8 feet. The walls are well defined, the east or hanging wall being dark-blue talcose slate, while the foot or western wall is composed of a dark-colored serpentine rock. The quartz is very hard, white and blue in color, and impregnated with some slate rock, containing abundant free gold, and the slate as well as the quartz contains rich gold-bearing sulphurets and galena. The elevation of this mine is about 3,000 feet above sea-level. The ledge is opened and worked through a shaft sunk on the ledge at the edge of Wolf Creek 5 by 10 feet in size, and is 150 feet deep, with three galleries or levels. The first level or tunnel is 43½ feet below the summit of the ledge at the shaft and 38 feet long; the second level, 55½ feet below the summit and 31 feet long; the third level, 126 feet below the summit and 25 feet long. This shaft and the several tunnels have cost about \$10,000 dollars. The quartz in the bottom of this shaft is becoming richer in free gold. Yield heretofore in the mill, \$18 to \$20 per ton; cost of running, \$4 to \$5; of milling \$1.25 per ton.

The Oro Quartz Company's ledge is situated about 500 feet above Downieville and the North Fork of the Yuba River. It yielded large returns in early days; the vein nearly "perished out" in the second level, and the mine lay dormant for several years. Two years ago some of the old members of the company re-organized it, and have driven a lower adit, in which they have recently found a promising vein about 5 feet, bearing S. 35° E., dipping easterly, but almost vertical, between well-defined walls of talcose slate. The mine now has three levels. The first one, several hundred feet below the summit of the croppings and 170 feet long, has been worked out to the surface. The second level, only 33 feet below the first, is 196 feet long, and between these two the

vein has also been worked out in part. The present company has run, 102 feet below the second, the third or lower level, which is now 490 feet long. It is proposed to build a new mill, to be driven by water-power, below the mine on the Yuba River.

The Monte Gristo Company's ledge, formerly the Johnson ledge, which had lain neglected for years, was this year purchased by San Francisco capitalists, who are now driving a lower tunnel 323 feet long to tap the ledge 163 feet below the upper level, which will give them backs or reserves of 175 to 190 feet. Their location is 4,000 feet long, and has an average course of nearly north and south, with a dip of 73° toward the east. This ledge is about 3 miles northwest from Downieville, and is 4,700 feet above sea-level, and about 2,400 feet above the North Yuba River. The former owners drove a cross-adit 100 feet below the highest point of the croppings, and at a distance of 26 feet the vein was cut 6 to 7 feet wide. They then sunk a winze 35 feet deep in the vein, which proved here to be 8 to 9 feet wide. The foot and hanging walls are talcose slate. The quartz in the bottom of the shaft contains much sulphurets and assays from \$25 to \$30 per ton. It is soft and friable, and hence the cost of the extraction of the ore is expected to be very small after the vein shall have been reached with the lower level. The company purposes then to build a mill, to be driven by water-power, obtained from Goodyear's Creek, a tributary of the North Yuba. The location of this mine, like that of the Oro ledge, is such that the ledges can be tapped by means of lower tunnels at small cost, dispensing with long tram-ways down the hill-side and avoiding the hoisting of the ore in the mine.

The Gold Bluff Mine is $1\frac{1}{4}$ miles northeast from Downieville, on the west side of the North Fork of the North Yuba River. The location comprises 4,400 feet in length on the vein. This mine was discovered and located in 1854, and received its name on account of the richness of the croppings in free gold. The ore was at that time packed in sacks upon the backs of mules from the summit of the ledge down the steep mountain (which rises at an angle of about 35°) by means of a trail cut around the hill-side; at the mill, 1,000 feet below the croppings, it was worked in a small two-stamp battery, driven by water-power. After having crushed all the ore that could be found near the surface, the owners drove a cross-adit 150 feet below the croppings into the vein, which they found increasing in width. This induced them in 1856 to build a new mill of eight stamps, at a cost of over \$20,000. It was provided with old-fashioned square stamps weighing 1,000 pounds. The work is said to have been profitable until 1859, when disagreements among the original owners and the outbreak of the great excitement over the silver-mines of Washoe caused its abandonment. A new company re-opened the mine in 1865, and realized in about two years \$35,000, the product of their own labor, from the old works above the tunnel, ground which was supposed to be nearly worked out. In 1864 a new tunnel was run about 600 feet below the old one, on the slope of the mountain, for the purpose of striking the main chimney or pay-shoot at a vertical depth of 300 feet below the old adit-level. The vein was quite narrow when first struck, but soon widened out to from 6 and 8 feet in thickness, standing vertical between its casings and walls of talcose slate. Explorations have exposed a continuous pay-chimney of nearly 600 feet in length. Having satisfied themselves that they had reached an extensive vein of pay-ore, the company built a new mill of 12 stamps of 600 pounds weight, with a crushing-capacity of 16 to 18 tons in 24 hours, driven by water brought $\frac{1}{4}$ mile in a flume (28 inches by 16

inches, at a grade of $\frac{3}{4}$ inch in 12 feet) from the Middle Fork of the North Fork of the North Yuba.

After the completion of this mill, the company worked the mine successfully, employing twenty to twenty-five men, until August, 1871, taking out a gross amount of \$150,000, besides the tailings, which were worked in two arrastras, immediately below the mill, the owners of the arrastras paying to the company for this privilege a royalty of 25 per cent. of the gross proceeds. The company declared, from January 1, 1870, to July 1, 1871, a dividend of \$27,632, besides paying for machinery, driving tunnels, making roads, and outside improvements. The exhaustion in some degree of the stopes above the level, together with quarrels in the company and the want of adequate explorations in depth or otherwise, has caused another suspension of work.

Around the highest and most prominent peak of Sierra County, the Sierra Buttes, (8,800 feet high,) are clustered many quartz-mines, well known for their past and present yield. The leading one of these, and one of the foremost in the State, is the mine of Sierra Buttes Company, which for the fiscal year ending June, 1875, crushed 49,821 tons of ore, yielding \$356,420—a little over \$7.15 per ton, exclusive of their tailing-assay of \$3.76 per ton.

I am indebted to Mr. William L. Oliver, of San Francisco, for the following summary of the operations of the mine and mills of this company for the year ending December 31, 1875. In the Sierra Buttes Mine, 240 men were employed, at \$2.50 to \$3 per day. The cost of mining per ton extracted was \$3.48; number of tons extracted and worked 54,636; average yield about \$7; total bullion product \$393,089. The three mills of the company are run by water-power, and contain 86 stamps, 3 pans, and 4 concentrators. Weight of stamps, 750 pounds; drop, 8 inches, 80 times per minute; capacity, about 2 tons per stamp per 24 hours; cost of treatment per ton, 77 $\frac{1}{2}$ cents. The ore contains 0.5 per cent. of sulphurets, which are amalgamated in pans after atmospheric oxidation.

The Independence Mine, belonging to an English company, is on the same lode, and immediately adjoins the three ledges of the Sierra Buttes, which unite near the boundary of these two companies, forming one large vein, 10 to 30 feet in thickness. The company owns 5,000 feet of the vein. It was worked as early as 1851. The first mill erected in 1856 burned down. The second mill was injured twice by avalanches. The third mill, built in 1861, had 24 stamps, and was carried away in March, 1868, by an avalanche, by which several persons were killed. In 1869 the fourth one was built, at a cost of about \$25,000, out of reach of snow-slides from the Buttes Mountain, near the entrance of the drainage-adit. The mill contains 24 stamps of 700 pounds weight, and a speed of 70 drops per minute, and 8 inches drop; also 1 Knox pan, and 1 Hendy's concentrator for the purpose of working sulphurets, &c. It has a crushing-capacity of 1,200 tons per month. An additional mill of 20 stamps has lately been erected, which will crush 1,000 tons per month. The Independence vein is worked by a series of levels driven partly alongside and partly in the ledge. Of these there are 5, each one about 100 feet from the next level above. The third level is reached by a cross-adit driven nearly at right angles to the vein from the Independence ravine, a distance of about 600 feet. This is the lowest point of natural drainage which the mine at present possesses, and through this adit all the ore is taken in cars to the mills. The cars are loaded in the levels below the third, and are brought to the hoisting-shaft, where they are hoisted on a cage to the third level, on which the hoisting-works

are situated, and are then run through the drainage-adit to the mills, where they are dumped. The batteries are supplied by automatic feeding-apparatus. This mine is kept free from water below the third level by powerful pumps. Adits may be driven from the Yuba, 2,000 feet vertically below the present drainage-level, or over 2,800 feet lower, measured on the dip of the vein, which is over 45° to the north. This mine is situated about 6,000 feet above sea-level. The machinery is driven partly by steam-power, costing \$51,000, and partly by water, brought in a large flume seven or eight miles long from several lakes, the capacity of which has been greatly increased by large dams, at a cost of over \$25,000. The walls of this mine are well defined. The quartz is very heavily impregnated with rich gold-bearing sulphurets. On account of the great difficulty encountered until recently in clearing the mine from water, the company could crush but little quartz during last year, but is now able to work both mills.

The Keystone Mine is situated about 13 miles easterly from Downieville and about 3 miles southerly from the Independence and Sierra Buttes Mine. It was worked in 1854 by Mexicans with arrastras. In 1860 a quartz-mill with 4 stamps was erected. In 1861 4 more stamps and again in 1866 4 additional stamps were added, making a total of 12 stamps, of about 550 pounds to 600 pounds weight, driven by a 20-horse-power engine. This mill was destroyed in March, 1868, by an avalanche. It was rebuilt the same year in a more sheltered place. In 1871 the company built a new mill below its lowest drain-tunnel, at a cost of \$20,000, containing 20 stamps of 600 pounds weight, having a speed of 65 drops per minute and 9 inches fall each, using also 1 Varney pan and settler. This mill has a crushing capacity of about 30 tons in 24 hours, and an average yield of \$20 per ton, at a cost of \$5 to \$8. The machinery is driven by a 50-horse-power steam-engine. The mine is about 6,000 feet above sea-level and 2,000 feet above the Yuba River. The present lower drain-tunnel, began in 1866, was finished in 1870, is about 700 feet below the summit of the croppings and over 1,900 feet long. From this the quartz is transported in cars to the mill, after having been hoisted from the works by a 30-horse-power engine. The location is 3,000 feet in length, with a course of N. 54° 21' E. true meridian, containing 49.97 acres of land, including the mill-site. It dips about 87° to the south, and consists of 3 pay shoots or chimneys as far as explored, $2\frac{1}{2}$ to 6 feet in width. The first pay shoot is 150 feet, the second 250 feet, and the third 380 feet in length along the vein. The walls are well defined and are a talcose black slate rock. The quartz is a ribbon-rock, and contains rich gold-bearing sulphurets and galena. The gold is fine, free, and evenly distributed through the pay chimneys. This company employs, when the mill is running, about 50 men.

The Phoenix Quartz Mine is situated about 6,000 feet above sea-level, on the eastern slope of the Sierra Buttes Mountain, about one and one-half miles easterly from the Sierra Buttes Mine. The lode courses N. 65° 43' E., with an average dip of about 78° to the north-northwest. It is incased in well-defined walls of metamorphic slate, with a few inches of gouge between the walls and quartz. The quartz is of white, yellow, and reddish color, containing free gold and rich gold-bearing sulphurets. The company has sunk on the foot-wall a 225-foot double shaft, through which hoisting is done in large buckets by horse-power and a whim. The quartz was in early days conveyed in sacks on mules down the steep hill-side to the company's mill at the river, at a cost of \$5 per ton, until the company built a wagon-road three miles long, after which it was hauled to the mill. The company's location on

the vein is 1,000 feet long, with an area, including the mill-site, of 19.40 acres. The mill contains four stamps, of 650 pounds weight, having a drop of 8 inches and 65 drops per minute, driven by a 12-foot diameter 3-foot breast overshot water-wheel; the water is brought in a flume 600 feet long, 15 by 13 inches in size, from the South Fork of the South Fork of the North Yuba River, crushing five tons in twenty-four hours, at a cost of \$3 per ton for mining and milling and \$2.50 for hauling to the mill. There has been about 1,000 tons crushed from this mine, yielding \$20,000. This mine is favorably located to drive lower adits, from which the quartz could be cheaply transported in buckets on endless wire ropes or tram-ways, so arranged that the loaded buckets or cars coming down and emptying themselves would return the empty ones.

The Empire Quartz Mine is located on the southwestern slope (near the dividing ridge) of the Yuba and Feather Rivers, on the left bank of the east branch of the North Fork of the North Yuba River, about five miles northwest from the Sierra Buttes Mountain, at and near an elevated mountain-valley, known as Gold Valley. The lowest point, the mill-site, is 5,550 feet above sea-level, while the highest point of the outcrop of the ledge is 6,100 feet in altitude. The average course of the ledge is N. 74° 30' E., and the length of the claim (as given in the application for patent) is 1,506 linear feet, inclosed in an area (including 5 acres for a mill-site) of 22.25 acres. The dip is from 38° to 55° to the south. The lode is incased in well-defined smooth walls of feldspathic rock on the foot-wall and slate on the hanging-wall. The quartz is mostly of a red and whitish color, and very heavily impregnated with different varieties of refractory sulphurets, predominating in many places over the quartz. This company has expended a great deal of money in extracting ore by sinking winzes and running tunnels following the ledge. The present lower tunnel is 374 feet long, and presents a quartz-vein of 8 to 12 feet in width. The ledge has been worked to a depth of over 200 feet. The mill consists of ten stamps, all machinery driven by an overshot water-wheel. The assorted refractory ore of sulphurets was conveyed to the chlorination-works. This company has made costly experiments in all kinds of gold-saving machinery and apparatus, but have failed to separate the gold from the refractory base metal.

The Four Hills Quartz Mine is located near the head of Little Bear Valley, near the Plumas and Sierra County line, close to the dividing summit of the Yuba and Feather Rivers; it is about midway between the Sierra Buttes and the Plumas Eureka Quartz Mines. The Buttes, Independence, Eureka, and Empire Mines are the most prominent croppings, and are only surpassed by the massive croppings of the Four Hills quartz-ledge. The first three mentioned are owned by English corporations. The Four Hills quartz-ledge is like all the beforementioned ledges, a gold-bearing true fissure-vein. It is well defined, from 5 to 80 feet wide on its croppings, with a dip of 45° to 85° to the southwest.

In close proximity west of this ledge we find a well-defined limestone belt and rich iron veins. This limestone belt apparently runs through California, and along the eastern side of it, within a short distance, runs the above referred to system of quartz-veins, traced by a succession of massive croppings for more than seventy miles, crossing creeks, rivers, and high ridges. About parallel to the limestone belt in this county iron deposits of the best quality occur, bounded on the east by granite and west by slates.

The Four Hills quartz-ledge is incased in well-defined smooth walls

of feldspathic granite and sandstone on the foot-wall and metamorphic slate on the hanging-wall. The quartz is of a red and white color, and some a ribbon-rock, heavily impregnated with rich sulphurets and galenas. The red quartz resembles that of the rose ledge of the Sierra Buttes Mine, while the white quartz has the appearance of the Cliff and Ariel ledges of the Buttes Mine. They also appear to be similarly located, the rose-colored rock to the east, the Ariel in the middle, and the Cliff to the west, being here all in one body, while in the buttes they form three distinct different ledges 50 to 100 feet apart and each having well-defined walls. This company has expended a great deal of money in developing their mine, in extracting ore by sinking many wide winzes, opening out the mine from the surface or croppings in a continuous line for about 1,000 feet in length.

They have also run tunnels through hard granite for the purpose of tapping the ledge lower. The lower tunnel started from a small valley on the head of the middle branch of the North Fork of the North Yuba River, and is now 400 feet long, the face being only about 50 feet from the ledge, and will tap the ledge over 200 feet below the croppings. The higher tunnel, near the dividing gap of the middle and east branches of the North Fork of the North Yuba River, is also 400 feet long, and is nearly all run in quartz-rock, on which the company are at present working. The quartz is conveyed on wagons down a steep hill to the mill. The mill contains four stamps, and is driven by a Fredenbass water-wheel under a 225-foot pressure. The first crushing was in 1865. The winters at this mine are quite severe, on account of its great altitude, the highest point of the croppings being 6,870 feet above sea-level. The snow lies often from 10 to 40 feet deep at the company's boarding-house near the mouth of the lower tunnel. This company has 2,615.95 linear feet of the ledge, containing 28.92 acres of area.

PLUMAS COUNTY.

The following account of this county has been contributed by J. A. Edman, of Mumford's Hill. I consider it an extremely valuable discussion, and am very grateful to Mr. Edman for the pains he has taken to add so important a contribution to this report.

From the beginning of the geological survey of California in 1860 to its discontinuance in 1873, though a mass of valuable material was collected in illustration of the geology of the State, but few publications bearing on practical geology and mining have reached the public. The surveys and observations on the ancient auriferous gravel deposits in the central part of the State are still inaccessible to the general reader, and may remain so for some time, until a more far-seeing spirit shall animate our legislators. A comparatively small portion of the gold-mining region of the Sierra Nevada has come within the observations of the members of the geological survey, the field of labor being so immense and the aims of the survey so exhaustive.

Some rapid reconnaissances were made by Professor Whitney and his assistants during the years 1861-'63-'65 of the most prominent points of Plumas County, chiefly on the eastern side of the county, where the important discovery of fossils belonging to the Jurassic period was made, near Taylorsville, all of which is embodied in the few pages devoted to Plumas County found in the first volume of the Geological Survey.

Since that time the extension of the public surveys has done much to increase our knowledge of the topography of the county, and individual explorations and researches, together with the operations of miners,

have thrown new light on its geology and mining resources. Although lacking the elaborate accuracy and high authority of the State survey, these may serve a practical purpose in directing attention to a region which offers a rich field alike for the studies of the geologist and for the labors of the miner.

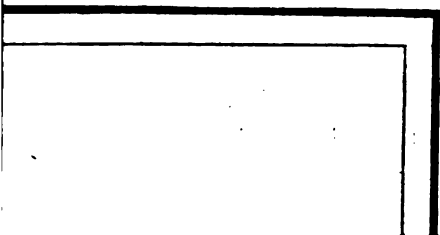
The purpose of this article is to illustrate the geognosy of the southwestern portion of Plumas County, from original surveys and explorations made by the writer, and from the most reliable observations obtainable from other sources. An indispensable aid to the comprehension of these will be found in the map designed to accompany this description, to which the reader is referred.

This map has been constructed on the basis of the map made for the county by Arthur W. Keddie, esq., and completed in 1874, a work commendable for its accuracy and finish in all that relates to the general topography of the county. To this gentleman the writer is under obligations for valuable assistance and information. On the geological map herewith given, the underlying rock-formations have been indicated by distinctive markings, and the gravel and volcanic deposits by colors, the same color generally being used for those deposits which appear to belong to a distinctive river-system or to have a common origin.* To avoid needless intricacy, mountain chains and ridges are not indicated, the highest peaks alone being shown.

The region under consideration forms that part of Plumas County embraced between the North Fork of Feather River, with its tributary, the East Branch, on the north and northwest, and the Middle Fork on the south and southeast, extending westerly to the county line and eastward to a point four miles east of Quincy. Within this territory the rock-formations most closely observed by the writer and herein most fully described are situated within and adjoining township 24 north, range 8 east. This township includes within its limits the eastern edge of the great mountain range which here culminates in Spanish Peak, one of the points marking, with Pilot Peak to the southeast and Lassen's Peak to the northwest, the axis of the Sierra Nevada, which after maintaining in the south the character of a high continuous chain here breaks into many irregular ridges, inclosing within their rocky barriers extensive and fertile mountain valleys.

The physical character of the region between the North and Middle Forks of Feather River is that of a broad mountain range rising generally above an altitude of 5,500 feet, its highest point being reached at Spanish Peak, 6,500 feet high. Its general trend is from southwest to northeast; cut by small streams flowing in their lower courses through deep cañons into the North or Middle Fork, respectively, it maintains its character of a continuous range until near the eastern line of township 24 north, range 8 east, where the northern portion, after forming the escarpments of which Spanish Peak is the most easterly, somewhat abruptly sinks into a low ridge separating the East Branch from its main affluent, Spanish Creek, while a southern branch, after suffering a slight depression, continues eastwardly between Spanish Creek and Middle Fork, and rising in Claremont Hill to an elevation nearly equal to Spanish Peak, subsides into lower ridges.

* It being impracticable to reproduce these colors in engraving, I must attempt to convey the information (less graphically) by simply saying that on the original map, the spaces numbered 2, 3, 4, 5, 6, 7, 7a, 7b, 8, and 8b are colored alike, and that the same is the case with the spaces *a* and *b*; the spaces 9, 10, and 11; the spaces 12 and 13; the spaces 14, 15, 16, 17, and 18; the spaces 19 and 20; the spaces 23, 24, 25, and 26; and the spaces 27, 28, 29, and 30. Where the spaces are far apart, it is possible that the similarity of coloring may not have been intended as significant.—R. W. R.





to consist of syenite, granite, and syenitic granite, which mostly form broad and rounded ranges with a gentle slope to the south, but presenting abrupt and precipitous slopes to the east and northeast where the slates adjoin them. This condition is caused not only by the upheaval of the granite masses, which appears to have taken place within a comparatively recent period, but also by the wearing away of the softer slates, and not least by glacial action of which indications are found on the eastern and northeastern slopes of Spanish Peak, where large basins now occupied by small lakes are excavated near the junction of the syenite with the slate, and where large fragments of syenite, mostly angular and in unstratified heaps, are found in and near the beds of the streams rising on the flanks of the mountain.

At the foot of Spanish Peak, inclosed by the mountain ranges above described, is a basin of irregularly circular outline and nearly three miles in diameter, forming two valleys, through which flow Spanish Creek and Meadow Valley Creek, and having its present outlet through the gorge cut by Lower Spanish Creek, which, after leaving this basin, pursues a sinuous course of four miles, and then enters the yet larger basin of American Valley, situated at an altitude of 3,400 feet. The Meadow Valley basin will be further described in treating of the geological formations in their order. Further to the west, and near the point where the main range branches off, are found two larger elevated valleys, namely, Buck's and Haskell's Valleys, situated at an altitude of nearly 5,000 feet and parallel in general direction; the former occupying a deep depression in the syenite 5 miles long by from one-half to one mile in width; the latter, situated at the junction of the syenite with the slates, of nearly the same length but somewhat narrower. In both these valleys the bed-rock has but a shallow covering of very recent gravel-beds, and no signs remain of glacial action. It is to be noted that both these valleys open to the south and southwest. Following the main ridge toward the Buckeye house, where the county line crosses it, we find the streams emptying to the North Fork generally flowing with steep descent through narrow and deep gorges, while the tributaries of the Middle Fork, such as the streams of the Gravel Range and Granite Basin, in their upper courses ramify in every direction between low and rounded ridges, and excavate deep cañons first when they approach the gorge of the Middle Fork.

After this general view of the physical geography of this section, we may next consider its geological features, commencing in the review of its rock-formations at the boundary-line between Plumas and Butte

Creek and proceeding eastward. As most of the region in question has but little geological history, and but recently surveyed, the information as to its extent of its formations, and these relate principally to the wagon-road from Buckeye to Quincy, which follows the crest of the ridge.

The rock near the Buckeye house is a compact granite which is overlain by a deposit (No. 1) of limited extent consisting mostly of well-worn pebbles of quartz. This deposit, at this point, is 10 feet in thickness, rests on the granite for more than half the flat summit of the ridge, and is black and compact, exhibiting a regular columnar structure. The forms of the granite point of a great body of the

The highest points within the region mentioned are generally found to consist of syenite, granite, and syenitic granite, which mostly form broad and rounded ranges with a gentle slope to the south, but presenting abrupt and precipitous slopes to the east and northeast where the slates adjoin them. This condition is caused not only by the upheaval of the granite masses, which appears to have taken place within a comparatively recent period, but also by the wearing away of the softer slates, and not least by glacial action of which indications are found on the eastern and northeastern slopes of Spanish Peak, where large basins now occupied by small lakes are excavated near the junction of the syenite with the slate, and where large fragments of syenite, mostly angular and in unstratified heaps, are found in and near the beds of the streams rising on the flanks of the mountain.

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After this general view of the physical geography of this section, we may next consider its geological features, commencing in the review of its rock-formations at the boundary-line between Plumas and Butte Counties and proceeding eastward. As most of the region in question has been little explored and but recently surveyed, the information as to its geology is vague and uncertain, so that but few data can be given as to the position and extent of its formations, and these relate principally to the vicinity of the wagon-road from Buckeye to Quincy, which here follows the summit of the ridge.

The underlying bed-rock near the Buckeye house is a compact granite and syenitic granite, here overlain by a gravel-deposit (No. 1) of limited extent and thickness, consisting mostly of well-worn pebbles of quartz. A sheet of basaltic rock, at this point 30 to 40 feet in thickness, rests on this gravel, forming for more than a mile the flat summit of the ridge, here called Walker's Plain. The basalt is black and compact, exhibiting at some points an irregular columnar structure.

The mass of granite forms the northern point of a great body of the

same rock which extends for many miles to the south and southwest into Butte County.

After passing the basalt at Walker's Plain, the ridge is covered by a loose deposit of volcanic material, consisting of the usual tufaceous beds intermixed with blocks of basalt and trachytic rocks, until near Palmetto the bed-rock crops out, here consisting mainly of talcose slates. Continuing in a northeasterly direction, the talcose slates change into a massive talcose rock of fibrous structure, which seems eminently fitted for furnace-linings and fire-proof material, and is used as such to a limited extent. The top of the range, which at a point about four miles east of Palmetto reaches its greatest altitude (5,900 feet) at Frenchman's Hill, is still composed of slates of varying composition, chiefly talcose, until on the slope of Frenchman's Hill toward Little Grizzly Creek true serpentine is observed for some distance. Proceeding southward we find the edge of a body of granite included within Granite Basin, where this rock, generally soft and deeply decomposed, has been formed into broad, low, and rounded ridges, with only occasional outcrops of massive rounded masses. It covers an area of about six square miles, and does not at any point form any high or prominent peak. Gold-bearing quartz-ledges have been found in this formation, among which the Spark's ledge was worked with profit for over two years.

Descending Frenchman's Hill and going eastward we cross Grizzly Creek and enter the western arm of Haskell's Valley, where a branch of Grizzly Creek takes its rise, flowing westward; while in the same valley, separated only by a slight swell of the ground, rises a branch of Buck's Creek, flowing northeasterly. In the extreme western end of the valley, the vast accumulations of loose gravel with angular and slightly worn blocks of a variety of greenstone found *in situ* close by, all of which deposits are devoid of any stratification, seem to indicate the existence of glacial action at a recent period, and before the present gorge of Upper Grizzly Creek was formed. The high and precipitous rock wall bounding the southern side of the valley and consisting of a variety of serpentine, impresses the beholder with a belief in the recent upheaval of the mountain, or a corresponding sinking of this part of the valley. Some isolated patches of basalt, conical in form, are found on the low hills north of the valley.

Following the road on an easterly course we find a magnesian rock, related to serpentine, but possessing a light-gray to reddish-gray color, and of fibrous structure, breaking in large irregular blocks, roughly weathered on the surface, and containing interspersed through its mass many small brownish-black cubical crystals of peroxide of iron.* This rock underlies the greater part of the valley and forms the high ridge on the south, continuing easterly nearly three miles to the head of Wilcox Creek, where it comes to a point, meeting clay slates on both sides. One mile southeast of Buck's Ranch, and near the gap through which the main stream of Haskell's Valley finds an outlet to Buck's Valley, we reach the southern limit of the great syenitic mass, which extends unbroken northeasterly to Spanish Peak, distant six miles, and to the northwest crosses the North Fork, beyond which it continues for a great distance, forming many of the most prominent mountains near the boundary-line between Butte and Plumas.

Tracing the edge of the syenite from the point above mentioned, its trend is at first nearly easterly through the middle of the eastern arm

* Doubtless pseudomorphs after pyrite, and produced by its oxidation.—R. W. R.

of Haskell's Valley; thence it gradually curves to the north, following a northeast course at the divide between Haskell's Valley and the west branches of Bear Creek, sweeping around which it crosses the divide between Bear Creek and upper Big Creek with a northeasterly course, and after entering township 24 north, range 8 east, one mile east of its southwest corner, turns still more, and thence to near Spanish Peak follows a course of north 12° west.

Adjoining the syenite are found near Haskell's Valley quartzites and hard blue clay-slates; at the head of Big Creek a gradual change to hornblende schist, next to mica slate, containing much quartz, which graduates into a hard, nearly black siliceous clay-slate.

Following the edge of the syenite into township 24 north, range 8 east, it is found on the flank of the mountain, which here towers nearly two thousand feet above the Meadow Valley Basin, its upper slope steep and with slightly broken surface, at its foot several lower ridges projecting into the valley. The comb of the mountain, slightly rising, forms Spanish Peak, which seen from any point of the country around it from the southeast to the north-northeast, forms a prominent landmark. A chain of peaks but slightly lower marks the edge of the syenite as it sweeps northwesterly toward the North Fork. The present channel of the East Branch, at Rich Bar, flows nearly four thousand feet below the crest of the mountain at a point between Silver Lake and Mill Creek, which fact would point to the immense denudation effected by that stream (the East Branch) if other causes have not aided to bring about the great difference of level. During late years some great slides from the mountain-side have found their way to the river along the bed of Mill Creek.

Near the head of Eagle Gulch the change from syenite to slates is sudden and without gradation, siliceous clay-slates abutting thereon. The same condition holds good along the eastern flank of the mountain, where slates of the same character adjoin the platonie rocks. The stroke of the slates varies from north 25° west, south 25° east, to north 45° west, south 45° east, of which north 36° west may be taken as the average for the western part of the township. With this stroke they join the syenite at the head of Eagle Gulch, meeting its edge at an angle of 24 degrees, but farther northward they appear deflected to the north and meet the syenite at a less angle, finally becoming parallel near Spanish Peak. The same condition is observable to the south, where the general stroke of the slates is changed near the contact with the syenite.

Near the head of Big Creek the main mass of syenite sends out an arm to the east-southeast, into the Bear Creek Basin. This body, which to a great extent is covered by a volcanic deposit, (No. 10,) appears to be about five miles in length by nearly two miles wide.

The plutonic rocks above mentioned vary considerably in composition and somewhat in structure, being fine-grained syenites chiefly near the eastern edge of the group, occasionally, by an admixture of dark mica, becoming syenitic granites, and toward the western limits showing more fully the composition of granite. Through the parallel arrangements of the hornblende crystals a slight gneissoid structure is often observable. But the most striking feature in the structure of the rocks of this group, particularly in its eastern portion, is their tendency to separate after parallel and nearly vertical planes into large slabs from a few inches to several feet in thickness, which shows in marked manner on the ridges to the north of Buck's Valley, and also on the eastern and northeastern flanks of the Spanish Peak Range. This appearance

often causes the syenite to resemble a stratified rock, but we find the planes of separation generally coinciding with the outer edge of the formation and consequently always changing. The planes of separation are rough and uneven, while nearly horizontal joints originate straight and smooth surfaces. At some points, mainly on the northeastern face of Spanish Peak, are found veins and dikes of later plutonic and trappean rocks.

Leaving the syenitic rocks near the head of Eagle Gulch and proceeding northeast, at nearly a right angle to the general trend of the strata, we descend to the basin of Meadow Valley over the upturned edges of formations here free from overlying deposits, and observe now successive belts of auriferous metamorphic rocks, which, in their grand simplicity of position and great extent, well deserve the study of the geologist and the miner.

The first group consists of slates and schists in the following order, (along the line A B C on the map:)

1st. Hard dark-blue clay-slates, alternating with quartzose slates, the former often carrying crystals and impregnations of iron-pyrites; these reach a width of over 3,000 feet.

2d. Green chloritic slates, decomposing into a soft, yellow rock.

3d. Grayish talcose clay-slate, with minute crystals of magnetic iron, and accompanied by a vein of magnetic iron, hematite, and iron-glance, associated with quartz.

4th. Greenish clay-slate. The aggregate width of the last three strata is near 1,000 feet.

Between the last stratum and adjacent talcose slates is found a remarkable ledge, the Diadem, (marked D L on the map,) here 50 feet in average width, noticeable as being in all probability the mother-ledge from which has been derived the principal gold-bearing deposits of the vicinity. The vein-stone of this ledge is magnesian limestone, penetrated by a network of small quartz-veins and filled with lumps of talcose slate rich in crystals of oxide of iron. Through this mass course larger veins of quartz, often swelling to large masses; it is frequently divided by bands or lenticular masses of an altered talcose slate, impregnated by decomposed sulphurets. Near the walls are often found alternating layers of clay and broken quartz and a ferruginous quartz-conglomerate. The magnesian limestone is decomposed to a great depth, forming a soft porous mass of brick-red earth, full of quartz and slate fragments, with rounded boulders of unaltered vein-stone reposing therein. Massive and crystallized pyrites and the resulting oxides of iron are here abundant. The strike of the ledge at Mumford's Hill is, with the adjoining slates, north 37° west, and its dip 60° to the northeast.

The explorations on this ledge, mainly at Mumford's Hill, have been carried to a depth of 100 feet, and have demonstrated the presence of fine gold through a large portion of the ledge, with occasional veins of high-grade ore, while the character of the ledge and the frequent occurrence of coarse gold in the gravel deposits situated on and adjoining it seem to point to the existence of rich pockets in the deposit.

The same vein-stone, with similar adjoining formations, can be traced northwesterly for over a mile; then, overlaid by gravel-beds and slides on the flanks of Spanish Peak, it appears again 4 miles distant, near Burton's Gulch. A ledge of the same character and near the extension of the same stratum occurs also at French Ravine, $1\frac{1}{2}$ miles from Rich Bar, and distant 5 miles from Burton's Gulch.

Apart from the interest which its mineralogical character suggests, it seems strange that this ledge has attracted so little attention and re-

ceived but few of the benefits which distant and inaccessible regions have derived from capital seeking profitable investment. All the creeks and gulches of both ancient and recent origin, cutting channels through this vein-formation, have been rich in coarse gold at and below the points of intersection; as, for instance, at Mumford's Hill, Eagle Gulch, Lead Point, Deadwood, and Burton's Gulch, as also Rich Bar, through French Ravine, appears to have been fed from the same source. In the palmy days of surface-mining, from the many prosperous camps then existing at those localities, large amounts of gold went out to the channels of commerce, while at this day the mines of this vicinity yield no inconsiderable returns.

Leaving the talcose slates near the Diadem Ledge and continuing our course to the northeast, (along the line A B C on the map,) we pass for 1,000 feet over quartz-schists, alternating with clay-slates, when we find them rather abruptly changing to a rock which may be classed with the greenstones. The slates described may be called the first slate group, have here a general strike of from north 25° to north 40° west, and a dip to the northeast of from 60° to 70° .

Their lateral extent may be estimated at 5,000 feet. In their longitudinal extension they undergo many changes in mineral character, chiefly owing to the intrusion of plutonic rocks. To the south quartzites and siliceous slates represent most of the strata of this group. Quartz-veins are abundant, but with the exception of the Diadem ledge have not been proved gold-bearing. Peroxide of manganese is found in large quantities, and smaller bodies of iron-ores occur in some localities. Native copper, associated with silicate of manganese, occurs near Eagle Gulch. The gold averages 950 thousandths in fineness, at one locality, Taylor's Gulch, reaching .970 fine. At one point only a small body of basalt is found, (near No. 11,) protruding through the edge of the slate, and altering to some extent the contiguous rock. With the exception of the slates nearest to the syenite, the strata of this group are but slightly metamorphosed and seldom bear crystalline structure. Next in the series, and adjoining the slates on the northeast, appears a great belt of homogeneous rock nearly 5,000 feet wide, which may be classed as greenstone or the diabase of some authors. This is light-blue, gray to grayish green, sometimes dark-green rock, hard and tough; generally massive; compact, to faintly crystalline, becoming occasionally porphyritic or amygdaloidal in structure. Although having some characters in common with the volcanic rocks, yet from its position and general appearance this must be classed with the metamorphic strata. By far the larger portion of this greenstone has been decomposed into a yellow or greenish-yellow rock, easily broken with the pick. This change has extended to a great depth, so that it is only in and near the beds of deeply eroded streams that we find the rock jutting out in hard and unaltered masses. The hills composed of this rock consequently are lower, more rounded, and less precipitous than those of the slate formation adjoining, and have a deeper, reddish, often clayey soil. A faint slaty structure is occasionally observable toward the edges of this belt. Quartz-veins found here are generally narrow, short, and irregular, and, with few unimportant exceptions, have not been found gold-bearing. Yet resting on this rock we find many of the richest surface-deposits, as the streams rising in the syenite or in the slates and cutting deep and narrow channels through the latter rocks, here expand into wider beds, forming flats and bars. To the southeast this belt is continuous to the Middle Fork and beyond; also to the northwest, where it, like the strata parallel with it, seems contracted laterally.

The greenstone gradually passing into slate is succeeded by a group of slaty rocks about 2,000 feet in width, consisting, in their order, of soft clay-slates, with chloritic and talcose slates, which finally, taking up quartz, appear as a narrow belt of mica-schist. These imperceptibly change to hornblende-schists, which finally give place to a narrow belt of syenitic gneiss at the junction of this group with the great belt of serpentine. This serpentine belt, underlying the Meadow Valley Basin, forms the largest continuous mass of metamorphic rock in this region, extending its course southeasterly with uncontracted dimensions beyond the Middle Fork, and appearing near the Saw-Pit Flats, not far distant from Pilot Peak, while to the northeast, after crossing the East Branch, it holds its course to the North Fork and beyond without decrease in width.

The last-mentioned group of slates is found at some points to the north, nearly east of Spanish Peak, partly of a crystalline appearance, somewhat resembling protogene granite in structure and composition; but this is only within a limited area.

If we continue on the same course at right angles to the general direction of the strata, we find the serpentine, the edge of which is just met a little to the west of Meadow Valley, overlaid by great volcanic and alluvial deposits, until beyond Spanish Ranch it appears in the foot-hills of that range, where its eastern edge is met, thus showing here a width of three miles. Through its greatest extent within this region it is covered by the older deposits of gravel, and it appears mainly in and near the beds of Spanish Creek, Lower Meadow Valley, and Rock Creek, where it generally forms a massive rock of a dark gray to dirty green color, separating into irregular large blocks, occasionally into flat slabs. When found on the slopes of hills it is often decomposed into a yellowish gray, often very tenacious clay, intermingled with blocks of hard rock, which on the surface are slightly rounded, roughly weathered, and of a yellow to dark-red color. The resulting soil also has a brick-red color.

Few opportunities are presented of observing deep sections through this rock, except as it is cut by the channel of the East Branch, where native copper has occasionally been found in lumps of some size. Chromic iron often occurs in the surface-gravel, as at Green Flat; platinum in small grains occurs sparingly in several localities on Upper Spanish Creek and on Silver Creek.

The eastern edge of the serpentine appears parallel with the western and with the general trend of the strata further west. East of the serpentine, near the eastern line of the township, we again meet a group of slates, mainly thinly laminated clay-slates, occupying a belt nearly 4,000 feet wide. These are again succeeded by a massive rock of the greenstone family, the extent of which is undetermined. This greenstone appears mostly at the bottom and sides of the gorge cut by Spanish Creek, and is scarcely traceable at a higher elevation. Large masses and ledges of limestone occur in the slates.

Next in order we meet talcose clay-slates, which, gradually taking up grains of quartz, change into a metamorphic arenaceous schist, which is found fully developed in the hills southwest of Quincy. This sandstone or quartzite schist appears nearly $1\frac{1}{2}$ miles wide at this point, (on the line A B C,) but to the north and south it narrows gradually by the encroachment of the adjoining slates.

The strata beyond Quincy and underlying American Valley are chiefly clay-slates, often siliceous, for nearly four miles, where a great belt of

trap-rock is met with. This region is not within the scope of the present article.

The slate groups east of the serpentine coincide in their strike with the slates on the west thereof; their dip is generally to the northeast at a somewhat greater angle, being found near Quincy at some points almost vertical. Occupying a belt nearly 4 miles wide, they are cut diagonally by the channel of Lower Spanish Creek, and except in its vicinity are in great part covered by deep gravel-beds, as at Gopher, Badger, and Hungarian Hills, and southerly at Slate Creek and Claremont Hill, localities to be described in the following pages.

After this general review of the rock-formations proper, both igneous and metamorphic, within the region described, the vast gravel-beds and associated volcanic deposits, so frequent within the eastern part of the area comprised between the North and Middle Forks of Feather River, will next claim our attention. A study of these, of the remains of ancient and now obliterated river-channels, and of the evidences of extraordinary volcanic activity, not only furnishes testimony of great geological changes, but is intimately connected with the successful explorations of deep mines and the judicious application of the hydraulic system of mining, now chiefly directed to the deep gravel-beds. The volcanic deposits referred to in the sequel, when not otherwise particularly described, consist of unstratified deposits of volcanic origin, composed chiefly of rough fragments of trap-rocks, mostly trachytes, inclosed in ash-gray volcanic sand or dust, often if not always cemented into a true agglomerate of varying hardness; carrying occasionally a few water-worn rocks, and generally associated with beds of tufa and soft sandstones. They generally form the surface-deposits, filling the upper portions of the ancient river-channels, and even extending over former ridges. Although varying much in color, hardness, and depth, they present a striking similarity of composition, and are found over a vast area in Middle and Northern California. They are frequently but erroneously called "lavas" by the miners.

In examining these deposits we begin at the southwest and proceed eastward, in the manner previously adopted while studying the underlying strata. With the exception of the gravel near Buckeye House, already described, with its basaltic cap-rock, but few and small patches of gravel are found near the summit of the range. Near the heads of Cold Water and Scotchman's Creeks thin beds of gravel occur in many places within the area of Gravel Range indicated on the map. The rocks therein are chiefly composed of rounded quartz-pebbles found in a red sandy soil, containing fine gold through its mass. This gravel seems related to the deposit at Buckeye. To the east of this, on the southern point of the ridge between Willow Creek and Little Bear Creek, at an elevation but little inferior to that of the main divide, we find at Mount Ararat considerable beds both of aqueous and igneous origin, (No. 2.) The lower beds, consisting of ferruginous gravel, often approaching conglomerates in hardness, are covered by clays and tufas, the whole overlain by a sheet of basalt of considerable thickness, extending along the ridge nearly two miles. Considerable prospecting by tunnels has been done in the gravel, but the difficulty of extracting the gold by washing has hitherto prevented work on a more extended scale.

Bear Creek deposit.—It is in approaching the point where the main range divides that we first meet deposits of great depth and extent, of which those situated on the upper branches of Bear Creek (No. 10) cover an area 5 miles long by 2 miles wide. Occupying the top and southern slope of the south branch of the main range, they show but

few beds of true river gravel, as the present streams cut but shallow channels through them. The largest masses of free gravel occur in the divide between the middle branches of Bear Creek and Big Creek, (No. 9,) immediately under the steep escarpments of the edge of the syenitic rocks. Here, as everywhere else when found in the same position, they are free from any capping of volcanic material, and consist of gravel-beds, with strata of clay and sandy clay. The creeks and gulches in this vicinity have furnished good placer-diggings. The water-worn rocks found here are of many varieties, chiefly resembling the rocks *in situ* to the south of Middle Fork. With this exception (No. 9) the great Bear Creek deposit consists of volcanic material—tufas and agglomerates—often carrying immense blocks of trachytes on the surface. As but few explorations have been made here, its depth and probable value cannot be determined. At No. 11 an isolated patch is seen, containing some auriferous gravel. Small bodies of basalt rise to the surface at some points.

A small body of gravel, overlaid by volcanic agglomerates, is found on the syenitic ridge between Haskell's and Buck's Valleys, (at No. 3,) and forms apparently the connecting-link between the beds near the Middle Fork (including Mount Ararat) and the great channel of the Spanish Peak Range.

Spanish Peak deposit.—The most elevated of the ancient channels is found in the Spanish Peak deposits, (No. 4,) which mainly consist of alternating beds of gravel and pipe-clay, filling the bottom of a rather narrow channel, and covered by deep beds of volcanic tufas and agglomerates. It forms the eastern comb of the Spanish Peak Range. Its southern portion is on a well-defined channel, and all of it on syenitic bed-rock. Its general direction is from south to north, then deflecting to the northwest; and it covers an area of from 1,000 to 4,000 feet in width, by about four miles in length. That the course of the ancient river was in the above direction is evidenced by the position and lithological character of the gravel-beds.

But few explorations have been made here and these were chiefly confined to the southern end of the deposit, where it attains a depth of 150 feet, the mass of which is volcanic material. Here a distinct channel is found, filled with strata of clay rich in the remains of vegetable life, chiefly the imprints of leaves. The gravel-beds, which are but slightly auriferous, are here 25 feet thick, lie almost horizontal, rest upon the pipe-clay, and are overlain by the tufas and agglomerates. At a point close to Spanish Peak quartz-gravel appears at the surface over a limited area, the rest of the deposit consisting of the volcanic beds. The well-worn rocks in the gravel are of many varieties, partly hard syenites, but chiefly kinds not found in place within the region adjoining, among which hard jaspery rocks and siliceous conglomerates are prominent, thus pointing to a distant, probably southern, origin. A well-defined rim-rock appears on the eastern side of this deposit, descending precipitously toward Gold and Silver Lakes, above which the mountain towers in a precipice 400 feet high. These lakelets are deep, irregular basins, situated mainly on the syenite; their waters have for many years been used for mining purposes, and form now the chief reservoirs of the ditches of the Plumas Mining and Water Company, which convey their waters to an extensive section of gravel-mines, at present chiefly worked at Gopher and Badger Hills, (Nos. 15 and 16.)

To the north, smaller bodies belonging to the same deposit occur at Mountain House (No. 5) and Fale's Hill, (No. 6,) at which points good placer and hydraulic mines have long been worked. The Fale's Hill

gravel is free from volcanic capping, has been nearly worked out, and has paid well. Small bodies of black basalt, but a few hundred feet in extent, are encountered at the southern end of deposit No. 4, near the western rim, and at the edge of No. 3. On the face of the precipice, near Gold Lake, several dikes of trap-rock intersect the syenite nearly vertically. Traces of copper-ores and gold-bearing quartz have also been found near this point.

Mumford's Hill and Scad Point.—On the belt of argillaceous and talcose slates adjoining the eastern edge of the syenite, and on the edge of the greenstone belt, occur smaller patches of gravel at Mumford's Hill (No. 8) and Scad Point, (No. 7,) the only remains of deposits made by streams which appear to have flowed from the southeast and to have emptied into the Spanish Peak channel, although now situated nearly 1,000 feet below the latter. The gravel in these is largely composed of greenstone and fragments of slate and quartz; on Scad Point, of rounded boulders of trachyte also. The Mumford's Hill deposit crosses and reposes for some distance on the great mother ledge of this vicinity, the Diadem ledge, which has been described above (on page 114,) and the coarse gold contained therein has been derived in great part from that ledge. Some of the richest placer-diggings of Plumas County (now nearly exhausted) existed in this immediate vicinity, on Taylor's Gulch, Eagle Gulch, and Deadwood, all of which streams have cut their channels through the gravel-deposits last mentioned and also through the Diadem Ledge. Hydraulic mining is yet carried on at Mumford's Hill and Scad Point on a larger scale than formerly, and with profitable result.

The deposit at No. 8a belongs to the Mumford's Hill channel; those at 7a and 7b to the Scad Point deposit.

Gold Bluff deposits.—The gravel-beds adjoining northward at Gold Bluff (Nos. 27 and 28) and between Clear Creek and Silver Creek, (Nos. 29 and 30,) are of limited extent, but were once continuous, and, from the character of the rocks they carry, may be considered as the continuation of the Gopher Hill deposits. They consist of rather loose and small gravel with well-rounded rocks of quartz, slate, and considerable quartzite or metamorphic sandstone, the rocks being nearly identical with those of the Gopher Hill group, but smaller in size. These beds have been cut through and much broken, and in places covered by vast slides from the edge of the syenite to the west. Glacial action also shows itself in well-defined terminal moraines on Clear Creek, remains of glaciers which at a time not very remote, descended from the mountain towering 2,000 feet above, and reached almost to the level of Meadow Valley.

But little mining has been done in these deposits, the broken nature of the ground being unfavorable for mining on a large scale. Some of the gulches paid well in former days. The only place at present worked with profit is at the edge of No. 30, at the head of Scale's Gulch, where the edge of the great Meadow Valley deposit meets the rim-rock of serpentine. The gold is here found partly on the serpentine bed-rock, partly on the cement or conglomerate resting on the serpentine.

Meadow Valley Basin.—Different in character as well as in extent, and forming the most interesting group of deep deposits, are the gravel, conglomerate, and tufa beds of the Meadow Valley Basin, (No. 12,) so named here from one of the valleys contained therein. These deposits being too complicated and diversified to be described in detail, only their most prominent characteristics can be here stated, as only the general outlines of the group have been shown on the map. Beginning at the southeast corner of township 24 north, range 8 east, these deposits

extend northward for over six miles into the next township, with an average breadth of more than two miles, within which area bed-rock is not visible except for some distance on upper Spanish Creek. Resting mainly on the serpentine, they occupy a basin irregular in outline, surrounded by a well-defined rim-rock sloping inward from each side, and probably attain their greatest depth midway between Meadow Valley and Spanish ranch. To the east this rim-rock has been cut to slight depth by Spanish and Meadow Valley Creeks, but the lowest levels attained by these streams do not bring to view more than the upper beds of the central basin. The only sections exposed are therefore found on Upper Spanish Creek, and to the south on the upper course of the tributaries of Meadow Valley Creek.

The formations vary much in character in different portions of the basin. The northern half may be described as composed of deep beds of ferruginous conglomerates of different degrees of hardness, forming the lowest beds, on which rest alternating strata of ferruginous clays and gravels. The conglomerates (agglomerates in part) are largely made up of trap-rocks, trachytes and porphyries predominating, which often are found therein in large blocks, rounded but not very smoothly worn. No stratification is visible in the beds exposed, and but little of the quartz, slate or other materials forming the surface-deposits. The cementing material is chiefly oxide of iron, derived from the decomposition of pyrites, which is found in abundance at some depth; near the serpentine, lime occasionally forms the cementing material. As far as explored, the above conglomerate rests on the bed-rock, and are not auriferous, practically speaking, as no gravel-deposits have been found in or under them. The recent channels of the streams which have eroded these beds are generally gold-bearing, and some have furnished rich diggings, as at Mountain House, Middle Spanish Creek, and Silver Creek, where the gold is found deposited immediately on the conglomerates. Shallow beds of gravel occur at many points on the elevated edges of the basin, seemingly derived from the recent streams emptying into it, and these beds are generally gold bearing, the surface-gravel proving most productive.

Near the center of the basin, between Spanish and Meadow Valley Creeks, a large area of level ground, called Grub Flats, fully 1,500 acres in extent, contains on its surface shallow gravel-beds seldom exceeding six feet in depth, and all more or less gold-bearing. Want of proper grade to carry off the tailings has alone prevented the extensive working of these deposits, which here rest on the above-mentioned conglomerates, on barren pebbly gravel, or on thin beds of red clay.

On the flats near Meadow Valley the surface-gravel rests on tufa-beds of undoubted volcanic origin, being of an ashy-gray color and containing much pumice. These characteristics generally pertain to the deposits of that part of the basin, south of Meadow Valley Creek, where they are mainly made up of finely-divided material, contrasting greatly, both in color and structure, with the coarse fragments of trap-rocks composing the bulk of the deposits of the northern portion. With the exception of a few points to the south of Meadow Valley, but little mining has been carried on in this part of the basin. The general features of the northern basin distinguish the beds near Mountain House, but in this neighborhood the older cement formation (conglomerates in miner's parlance) is often overlain by more recent gravel-beds, which may be referred to the gravels of the Waponeh group, to be hereafter described. At two points, (*a* and *b*), at Bear Hill and below Mountain House, occur, about two miles apart, deep beds of sandy gravel com-

posed almost entirely of well-worn pebbles and small rocks of white and grayish-blue quartz, which have been mined with profit. No other beds of similar gravel exist anywhere in this region, the nearest deposits of the same materials being found 20 miles distant, in southeastern Plumas County, near La Porte and Gibsonville.

The extreme northwestern arm of the basin approaches at Mountain House within a few hundred feet of an older deposit of volcanic beds (No. 5) occupying the flat top of the dividing ridge between Spanish Creek and the East Branch, and which, as before mentioned, is to be classed with the Spanish Peak deposits.

The highest gravel-beds of the Meadow Valley Basin occur on its rim at Mountain House, at an altitude of fully 600 feet above the surface of the deposit at its center, where it may be assumed to attain a depth of 150 feet. This fact seems to point out the great erosion which has taken place since the first formation of this deposit. A distinguishing feature of this basin is the presence of fine gold in the surface-gravels, especially in the thinner gravel-beds situated on the interior slopes of its rim-rock. The streams which now course through it have for ages been concentrating and reducing the lighter and less cohesive surface-beds, a fact which is attested by the abundance of heavy magnetic iron-sand and pebbles of iron-stone and other heavy rocks found at the surface.

The evidence of geology and present topography points to the probability that the Meadow Valley Basin contains a lacustrine deposit, principally made by a large stream entering the basin from the northwest, and having its outlet at some point to the southwest, near Upper Rock Creek or Slate Creek.

With the exception of a few shafts sunk near Grub Flat, and said to have reached the bed-rock at a depth of 100 feet, no deep explorations have been made in the center of the basin. Fragments of petrified woods, but as yet no other fossils, have been found.

Excepting the claims of the Golden Enterprise, lately opened near Spanish Ranch, no mining operation of magnitude is at present carried on within all this area. Rich placer-diggings existed for many years on Upper Spanish Creek and its tributaries, particularly between Silver Creek and Mountain House; but these are now almost exhausted. The more accessible flats promise the miner a fair profit, if properly opened and worked with the assistance of moderate capital.

The Slate Creek deposits, (No. 13,) although separated by the channel of Rock Creek from the main body of the Meadow Valley Basin, correspond so closely in structure and mineral characters with the latter that they need not here be separately described.

Gopher Hill group.—Subordinate in magnitude, but at present far surpassing the above-described deposits in economic value, are the adjoining deposits in the east—the Gopher Hill group of gravel-beds, (Nos. 14, 15, 16, 17,) found chiefly on the hills to the north of Spanish Creek, which here enters a deep gorge. The gravel occurs at varying heights above the present stream, being 300 feet above it at the eastern section at Railroad Hill, (No. 17,) and but a few feet above it near the western end at Waponeh Creek.

These beds consist mainly of rather loose gravel, free from any covering of volcanic material, that attain an average depth of 100 feet, and are covered by a stratum of pipe-clay in their higher portions, as at Badger Hill, (No. 16.) The rocks they contain, generally smoothly worn, but not fully rounded, are like the bed-rock immediately underlying, such as slate and greenstone, and that to the eastward, in which

fragments of the hard sandstone schist of the Quincy belt are particularly abundant. Well-worn quartz boulders are also numerous. Fine gold is found throughout the gravel, with coarse gold in the bed-rock. Some platina is obtained with the gold—the most at Railroad Hill.

The external character of this deposit is that of a broad channel averaging near 2,000 feet in width, with a well-defined rim-rock on the northern side, the southern rim being cut off by Spanish Creek. Its general course is from east-southeast to west-northwest, and its situation is extremely favorable for successful working, there being abundant discharge for tailings, and no cemented strata to obstruct the washing down of the gravel-banks. The deposit is cut, by Waponeh Creek and some gulches, nearly at right angles to its direction.

For more than 20 years highly remunerative mining operations have been carried on in deposit, chiefly by the hydraulic system. Of late all the modern appliances have come into use, mainly in the claims of the Plumas Mining and Water Company, operating in Gopher Hill. These mines derive their water-supply by means of a ditch from Upper Spanish Creek, and, as already remarked, from the lakes in the Spanish Peak Range. They have already added much to the gold-production of the country, and bid fair to attain still greater importance in the near future. The whole of this deposit is claimed, and worked at several points.

Opposite the most eastern body of this group, at Hungarian Hill, (No. 18,) on the south side of Spanish Creek, is a deposit generally considered as belonging to the Gopher Hill group, although its general features are somewhat different. Its practical importance has been but little inferior to that of the above gravel-beds. Situated on the southern slope of a ridge parallel with Spanish Creek, and on a broad point of the main ridge, extending southeast to Claremont Hill, its most important beds consist of red clayey loam, with gravel sparsely intermixed, the most gold being found on the bed-rock. Further to the south, the gravel becomes deeper, and approximates more to that of Gopher Hill, attaining here a depth of 150 feet, and in parts overlying the conglomerates of Slate Creek.

The ground hitherto worked in this deposit, which yielded rich returns during the last eight years, was situated on its northern edge near the head of Hungarian Gulch, and disconnected from the main body of deep gravel. The depth of the old workings seldom exceeded 40 feet, and offered every facility for rapid washing. At present, the Hungarian Hill Mining Company, working on an extensive scale, has given most attention to the deep gravel further south, with fair prospects of ultimate success. The supply of water for the higher portion of the gravel-beds is derived from Mill Creek, and, being taken at great altitude, is not permanent.

Waponeh group.—Adjoining the Gopher Hill group on the north, but separated from it by a narrow belt of bed-rock, is another gravel-deposit, cut near its center by Waponeh Creek, a tributary of Spanish Creek, which, eroding it to considerable depth, does not expose the underlying bed-rock in its deepest or central portion. Its general direction is from southeast to northwest, and it reaches its greatest altitude at the extremities, chiefly on the northwest, where it is capped by volcanic beds and extends to the top of the main divide, within two miles of the East Branch. Its upper beds are elevated fully 600 feet above its central portion. The general appearance of the gravel is similar to that of the Gopher Hill group, being red in color, but not so loose and sandy, and showing more trachyte, diorite, and porphyry among its rocks.

These deposits, (Nos. 19 and 20,) which may be designated as the Waponeh group, have been but slightly explored in their southern part. Some profitable workings are found in and near the bed of Waponeh Creek. Further north, where cut by some gulches flowing southward, as at Pine-Leaf Ravine, rich placer-diggings have been worked, and operations, by tunneling in the edge of the main deposit, give promise of fair returns. The main channel of this deposit has not yet been found. The gold is chiefly confined to the gravel nearest to the bed-rock.

To the northeast of this group, two basins among the hills, as Snake Lake and Smith's Lake, show recent alluvial deposits on the site of former lakes, where but small ponds now remain. The level surface of the former, about 200 acres in extent, consists of pure vegetable mold to some depth, resting on sandy clays and beds of loose gravel. This region is underlain by the metamorphic sandstones, and shows many outcroppings of quartz-veins.

Still further to the northeast is Butterfly Valley, beyond which an extensive gravel-deposit, but slightly projected, is encountered. Its mineral characters resemble those of the Waponeh group, but not being familiar to the writer, it is only indicated on the map in its general outline.

Equidistant between this and Quincy, extensive gravel-beds occur at Newtown and Elizabethtown. At the latter place, rich placer-mines formerly existed in many of the gulches, and several tunnel-claims in the gravel-hills gave excellent profits. But little mining is done here at present, chiefly on account of the scarcity of water. A branch of the Plumas water-ditch reaches this region, but its water-supply is now utilized at the mines of the Gopher Hill group. Whenever abundance of cheap water can be had, these mines will undoubtedly yield rich returns.

Alluvium of American Valley.—While noting the older gravel-deposits, it may be instructive to mention an instance of a recent formation, or one which is yet in progress on a large scale, as evidenced by the alluvial deposits in American Valley, an outline of which is given on the map. Nearly two miles west of Quincy, Spanish Creek enters the valley, which is at that point narrow, but gradually expands eastward, its greatest width being nearly a mile and a half. Two arms of the valley follow the lower courses of Mill Creek and Spring Garden Creek. The level lands of the valley comprise fully 4,500 acres, all of which are occupied by recent gravel-beds of slight cohesion, the surface being generally a sandy or gravelly loam. As no explorations by deep shafts have been made, their depth is unknown; but from the general contour of the surrounding hills, it must be fully 100 feet in the central part of the valley. The valley appears to have been formed by the general and gradual subsidence of the contiguous country, and to have been gradually filling with gravel, light sand, and sediments from the large creeks debouching into it, even before the mining-operations on Spanish Creek added vast accumulations of tailings. The flat near Lower Mill Creek contains the heaviest gravel-beds, derived from the *débris* of the Claremont Hill deposits, and needs only to be uplifted and broken to resemble many older gravel-beds. No mining is done in the level lands of the valley, and but little in the hills surrounding it.

Claremont Hill deposit.—Nearly four miles south of Quincy, and towering above the valley fully 2,500 feet, is seen the summit of Claremont Hill, a broad, dome-shaped crest, rising to an elevation nearly equal to that of Spanish Creek, and forming the highest point of the dividing

ridge between Middle Fork and the branches of Spanish Creek. A low gap to the west separates it from the Bear Creek deposits, and another still lower forms a depression eastward near Willow Ranch. On the highest part of the mountain, chiefly on its southern and western slope, occurs a vast deposit (No. 23) of volcanic beds overlying gravel, which appears in some places where the rim-rock is broken by slides, as at the head of some of the ravines descending to Middle Fork. The explorations which for a series of years have been made here have not reached the center of the ancient channel, but have demonstrated the presence of gold-bearing gravel on the interior slopes of the southern rim, here overlain by heavy beds of pipe-clay and sandy clay. The gravel is largely composed of quartz-boulders, and resembles in some degree that found in the adjoining Willow Ranch deposit, which probably at one time was connected with it.

Although the mythical "Blue Lead" is supposed to run through this mountain, and a strong probability exists that this channel forms a continuation of the Washington Hill deposits at Saw-Pit Flats, noted for their richness, yet all the prospecting hitherto done here has been the result of the unaided efforts of a few men without means, who are unequal to the task, while the communities who would reap the most benefits from discoveries made here do not show their faith by works.

As but few surveys have yet been made of the Claremont Hill deposit, it is indicated on the map only in an approximate outline, which is the case, likewise, with the gravel-beds adjoining it on the east.

On the northern side of Claremont Hill, where it slopes abruptly to American Valley, rise the branches of Mill Creek, on which stream placer-diggings have been worked for some years. The branches of Rock Creek, on the western slope, have not been thoroughly explored, but have furnished paying surface-mines at some points. In fact the whole region from Claremont Hill westward to the main branch of Bear Creek, a distance of ten miles, covered in most of its extent with volcanic and gravel beds, remains to this day *terra incognita* to all but the hunter and an occasional prospector.

Willow Creek deposits.—The Willow Creek deposits, next to the eastward, extend from a point on the Middle Fork opposite Nelson Point northwardly for three miles, while a branch reaches still further toward Spring Garden Creek. Willow Creek exposes to view the gravel-beds of the southern portion, which here consist of red and gray firm gravels, chiefly made up of large and small smoothly-worn boulders of white and bluish-white quartz. The extreme southern point of the deposit has been worked successfully near the river opposite Nelson Point, and also along Willow Creek and its gulches, where good placer-mines yet exist. It is only lately that attention has been turned to the deeper beds, which remain almost unexplored. The northern part of this deposit is formed by deep beds of tufas and conglomerates, as seen along Thompson's Creek, where appears also the heaviest bed of basalt in this region, filling for some distance the bed of the creek and spreading over the adjoining hill-sides. The basalt is nearly black, generally quite hard and compact, of a globular, occasionally of a columnar, structure. Its extent to the northeast is not ascertained. A mining company is at present sinking a shaft through the basalt, in the hope of finding a gravel-channel beneath.

On the south bank of the Middle Fork and close to the water's edge, a rich gravel-deposit, discovered in 1874, is now worked with excellent results. This, although referred by some to the ancient gravel-beds, is

probably of comparatively recent origin, and a former channel of Middle Fork.

Saw-Pit Flat deposit.—It would be beyond the scope of this description to enter into a description of the vast gravel-deposits south of the Middle Fork and to the east and south of Pilot Peak, a region which for years has been famous for its deep gravel-mines, worked both by drifting and by the hydraulic process, and second to none in the State in the amount of gold it has produced. It only remains to notice briefly the gravel-beds of Washington and Richmond Hills, near Saw-Pit Flat, which for years have been the scenes of extensive tunnel-mining.

The Washington Hill deposits occupy the divide between the Middle Fork and Onion Valley Creek, at an elevation of nearly 6,000 feet, and fill an ancient river-channel of varying width, seldom exceeding 500 or 600 feet. In the bottom gravel occur enormous water-worn boulders of white and bluish-white quartz, the finer sand and gravel between them being chiefly derived from the wearing down of the quartz. This gravel averages but 8 to 10 feet in depth and is generally highly auriferous. Beds of clay and soft sandstones overlie the bottom gravel, with occasional beds of lighter gravel on the rim-rock. Over all this rest heavy beds of tufas and agglomerates filled with fragments of trachyte and basalt, having a depth at the center of the ridge of 300 feet, and a width across the channel of from 2,000 to 3,000 feet.

Isolated knobs and masses of basalt appear along the southern edge of the volcanic beds, and at one point near Burg Creek form lines of regular terraces. Basaltic masses are also seen at many points on the hill-sides south of Onion Creek.

The Washington Hill beds extend eastward to Onion Valley, where traces are found of recent glacial action. Active operations are here in progress to reach the eastern end of the ancient channel. In the central portion, most of the channel has been worked out by drifting, the Monitor claims being the only ones now actively worked on the channel west of its center. A large part yet remains of the western extremity of the deposit, which was formerly worked at a few points.

The eastern edge of the great serpentine beds underlies the western end of this deposit. Hornblende rock, talcose slates, and clay slates are found under the largest portion.

The Richmond Hill deposit, although separated from the above by a narrow belt of high bed-rock and free from the capping of volcanic beds, is identical with it in mineral characters, and was probably formed on a branch of the main stream. It is of limited extent as compared with Washington Hill. During late years hydraulic mining has been carried on in the outer edges of the old drift-diggings, and with profitable results, much gold in extremely fine division being found in the upper beds of light sandy gravel.

It will remain for future extended explorations and surveys to accurately map out and trace the connection between the above-described deposits. The aim of this description is chiefly to present a general view of the vast ancient gravel-beds, yet scarcely touched, in which Plumas County abounds, and to contribute in some degree to the explanation of their probable origin and of the causes which have produced the changes in the rock-strata underlying them.

Without discussing the relative merits of the many theories advocated by different investigators regarding the formation of the ancient gravel-beds, the writer is induced by extended observations in this region during a period of twenty years to express his conviction that all the phenomena of the old gravel-beds may be referred to the erosive power of

large and rapid streams, acting in a manner analogous to that now observed on this coast and continent. If sufficient time be given, changes in the climate from a dry to an extremely humid atmosphere, from a high to a low temperature, would create the forces necessary to excavate the old channels and to transport the materials found therein. Under such conditions, nearly all the ancient gravels in the Sierra must be considered as of fluvial and lacustrine origin. In the region described, no gravel-beds of maritime origin have yet been observed. Glacial action has here played a subordinate part in bringing about the great changes of the surface since the deposition of the older gravel-beds.

It must be admitted that a period of extraordinary volcanic activity must have prevailed within the region of the Sierra Nevada subsequent to the formation of the most ancient gravel-deposits and while some of the later beds were in process of formation. In all probability this period was contemporaneous with the great changes in relative level wrought in the underlying rock-strata, evidences of which are abundant within the region described, especially in the Spanish Peak Range, where a study of the great syenitic mass will show its upheaval along its eastern edge, the adjoining strata being bent, folded, contorted, altered in mineral characters, and changed in both dip and strike near the line of junction, and often for a distance of two miles from that line. On a closer inspection, other well-marked lines of volcanic activity will probably be found. The mountain-range between American and Indian Valleys, the foot-hills of which rise four miles east of Quincy (near Red Hill) and the general direction of which is parallel with the strata above described, appears to be on the next line of upheaval. This range is composed almost exclusively of trap-rocks, such as diorite, dolerite, and basaltic porphyries. Mount Hough forms one of its culminating points.

A comparatively small portion only of the volcanic fragmentary materials, such as tufas and agglomerates, which cover most of the ancient gravel-beds, has been subjected to the action of running water, and where such action has occurred it has been but in slight degree. Although some of the volcanic beds are mingled with a few water-worn pebbles and rocks, there is generally a total absence of these; and the large masses and smaller fragments of trap-rocks scattered through these beds, with an almost total absence of stratification, are irregular in shape and but seldom water-worn. When they are round, they generally owe this shape to the globular structure of the rock from which they are derived.

Most of the volcanic beds must, therefore, be considered as emanating from the direct action of eruptive forces, being accumulations of ejected matter on the sides and slopes of active craters and in their vicinity. That such forces may act from one center and extend over a large area is evidenced within historical times by eruptions of active volcanoes on this continent, as in Central America; and also in Europe, as particularly shown by the recent eruptions in Iceland, when the lighter volcanic ashes were carried as far southeast as the eastern coast of Sweden, distant over 800 miles.

The nearest center of extensive volcanic activity within Plumas County is found in the region surrounding Lassen's Peak, at a distance of 30 miles north-northeast from Quincy, where many traces of quite recent volcanic action may be observed. From here emanate several distinct flows of basaltic lava. Another extensive range of trap-rock, chiefly trachyte, occurs east of Indian Valley, about 12 miles from

Quincy. From these centers all the material for the volcanic beds within the county may have been derived, without accepting the theory of a continuous sheet of volcanic deposits and lava-beds from the summit of the Sierras to the foot-hills of the Sacramento Valley. In contradiction of the latter theory, actual observation of the volcanic beds in their relation to the basaltic masses occurring at so many points within the region above described, (but few of which are shown on the map,) forces the conviction that independent volcanic action took place at many distinct points distant from the great apparent centers of activity. Most of the smaller bodies of basalt are not parts of a great general outflow of melted matter, but the results of direct eruptions at such points, as is evidenced upon closer examination by the protrusion of the basalt through the underlying bed-rock, which is always greatly altered for some distance around such points. This is notably shown in some of the tunnels at Washington Hill and at other localities within the observation of the writer.

Distinct auriferous zones.—Although gold may be found in nearly every portion of the region reviewed, yet certain zones may be traced as eminently auriferous, while others adjoining them are comparatively barren. Little gold, except what has been derived from the overlying gravel, is found in the beds of the streams coursing through the great syenitic mass of the Spanish Peak Range, and no ledge of gold-bearing quartz has yet been discovered in that mass. The most productive zone is within the group of slates situated between the syenite and the belt of greenstone, particularly in the talcose slates. This condition holds good in the southwest at or near the junction of the slates with syenite, granite, and serpentine.

Gold occurs sparingly in the recent alluvium originating in the greenstone belt, or *in situ* in this rock. The next slate group adjoining the serpentine shows but few original gold-deposits of any kind.

Within the great serpentine belt no gold is known occurring in place, and but little in alluvial beds that cannot be traced to the older gravel-deposits situated upon it. This rock has undoubtedly furnished the platina found in the vicinity. The slate group east of the serpentine appears to be auriferous to some extent, particularly near the edge of the sandstone-schist, which latter gives evidence of having originated many auriferous deposits. This contains a number of gold-bearing veins and ledges lately discovered and promising well for the future, which would entitle this zone to be ranked next in importance to the first-mentioned group of slates.

As yet but few data are known from which to determine the relative age of the deep gravel and volcanic beds. At present the following classification may be attempted, beginning with the oldest deposits: Spanish Peak, Bear Creek, and Claremont Hill groups, Saw-Pit Flat and Willow Creek deposits, lower beds of the Meadow Valley Basin, Waponeh group, Gopher Hill deposits, and the upper beds of Meadow Valley Basin, as most recent.

Some vegetable-fossil remains from the Spanish Peak deposit were submitted for examination to the late geographical survey, but were not reported upon. The forms there found are closely allied, if not identical, with the now existing types of plant-life.

It is to be hoped that a thorough explanation and geological survey of this and adjoining counties may take place within the life-time of the present generation, a work that cannot fail to develop facts of practical value for the miner, open a rich field for the student of geology, and furnish important deductions to the man of science. In the mean time,

these contributions are submitted by Mr. Edman, who, slightly altering the poet's sentiments, believes that "they serve best who do not stand and wait."

Quartz-mining.—The following data concerning the Plumas Eureka Mine, in *Jamison district*, are furnished by Mr. W. L. Oliver. Number of miners, 175; wages, \$3 per day; cost of mining, \$5.35 per ton extracted; of milling, \$1.25; number of tons extracted and worked in 1875, 28,777; average yield, \$13; total bullion-product, \$381,317; percentage of sulphurets, 1.25. The company's steam and water power mill has 40 stamps of 750 pounds, falling 10 inches 80 times per minute; 2 pans, 22 concentrators; capacity, 2.25 tons per stamp per twenty-four hours, (or 1.48 tons per horse-power, guaranteed by the fall of stamps;) tons crushed in 1875, 58,823. The sulphurets are roasted in a Brückner furnace and then amalgamated in pans.

SISKIYOU AND KLAMATH COUNTIES.

The northern mining-counties are Siskiyou, Klamath, Trinity, and Shasta, the two first named bordering on the State of Oregon. Almost the entire area of these counties consists of high mountains, deep ravines, gulches, and cañons. The formation is granite and auriferous slates. The physical characteristics of the principal quartz-mining region are described in the Report of 1873, pp. 100 to 200. The most productive mines are the Black Bear and Klamath, each running a mill of 32 stamps. The country-rock in which these veins are found is talcose slate, through which the quartz is irregularly distributed, sometimes to a width of 100 feet. The yield of the mines varies from \$12 to \$24 per ton. The quartz bears a strong resemblance to that of the Mother lode in the central counties. Klamath County has five mills, which cost in the aggregate \$80,000. The total number of stamps is 80. The annual gold-production of this portion of the State is about \$2,000,000.

The following data from this county are furnished by the gentlemen named as superintendents:

Klamath Mine, owned by Klamath Company; John Daggett, superintendent; course, northeast and southwest; dip, 20°; pay-zone, 5 feet wide, 1,000 feet long; vein, quartz; country-rock, black slate; greatest depth of mine, 600 feet; greatest horizontal length, 1,200 feet; two levels opened by tunnels, 600 and 1,200 feet long. Cost of tunnels, \$20,000; 25 miners employed for 6 months of 1875 and 13 for the remainder; wages, \$60 per month and board; cost of drifting, \$6 to \$7.50 and \$10 per foot; cost of mining, \$3.50 per ton of ore extracted; cost of milling, \$1.50 per ton; hauling, 25 cents; 5,000 tons extracted and worked in 9 months of 1875; average yield, \$10; sulphurets, 2 per cent.; total bullion, \$250,000. Company's mill, water and steam power; 32 stamps, 600 pounds, 75 drops of 8 inches per minute; 2 buddles; 1 pan, not used; cost of mill, \$40,000; capacity, 50 tons in 24 hours. No sulphuret process at present.

Morning Star Mine, owned by Doran & Co.; Richard Doran, superintendent; location, 2,500 feet; course, east and west; dip, north; pay-zone, 2½ feet wide, 1,000 feet long; vein, talcose, in hornblendic slate; two levels, (tunnels,) 130 and 260 feet deep; length of tunnels, 300 and 500 feet; cost, \$8,000; length of horizontal exploration of vein, 300 feet; 30 miners, at \$50 to \$60 per month; cost of drifting, \$5 to \$10 per foot; of stoping, \$2.50 per ton; of mining, \$4.50 per ton delivered at mill; of milling, \$2 per ton; 420 tons per month for 3 months extracted and milled, yielding \$15 to \$18 per ton; a high percentage of sulphurets.

Company's mill; water-power; 16 stamps, 90 drops per minute, (weight and height of drop not given;) 2 pans, in which sulphurets are treated; cost of mill, \$20,000; capacity, 30 tons per 24 hours. The cost of treatment is given under this head as \$4 per ton, and above as only \$2. The larger sum probably includes the treatment of the sulphurets, and the smaller one only the crushing and plate-amalgamation.

Mr. W. L. Oliver, of San Francisco, has furnished the following summary concerning the Black Bear mine and mill, owned by the company of the same name: In 1875 there were employed 140 miners, at \$3 per day; cost of mining per ton extracted, \$6.15; of milling, \$1.23; tons extracted and worked, 15,998; average yield, \$15.51; percentage of sulphurets, 1.12; total bullion-product, \$242,000. Mill, 32 stamps, (700 pounds, 80 drops of 8 inches per minute;) 1 pan, 2 concentrators; capacity, 1.48 tons per stamp per 24 hours; power, steam and water. Sulphurets are roasted in a reverberatory and then amalgamated in a pan.

TRINITY COUNTY.

This county was described at length in a former report. For later information concerning it I am now indebted to Dr. H. De Groot, of San Francisco.

Although hydraulic washing on anything like an extended scale was introduced into this county within the past two or three years only, it has already become the leading branch of mining there, the material being abundant and the natural facilities very great. A number of schemes directed to bringing in a more plentiful supply of water, and to opening up large gravel-claims, have lately been projected in the county. While a few of these remain still in embryo, others are in progress of execution, some being pushed very actively forward.

On the Loveridge Ditch, projected about three years ago, for taking a large volume of water from Stewart's Fork and carrying it into Weaver Basin and intermediate camps, little work has since been done, and the rich auriferous country to be traversed by it remains unworked for want of water. This, though a formidable enterprise, involving the necessity of depressing the conducting-pipes more than a thousand feet below the ditch-level in order to convey the water across a deep gorge that lies in its course, is still one from which California hydraulic miners need not shrink, and which, in Dr. De Groot's opinion, should readily command all needed capital, as it could hardly fail to prove a good investment.

The canal of the Weaverville Ditch and Mining Company was finished during the year, and water has been brought in considerable quantity upon Oregon Gulch Mountain, where the company owns a large tract of auriferous gravel. This claim having meantime been furnished with first-class hydraulic apparatus, washing was here commenced with the opening of the water-season. No clean-up had yet been made at the time of Dr. De Groot's visit, but large results might reasonably be expected, since the material is reported to prospect throughout at the rate of \$2 per cubic yard, and was estimated to have an average depth of 300 feet over an area of several hundred acres. Indeed, a large section of the mountain seems to consist of pay-gravel to the depth of two or three hundred feet.

In the spring of 1874, the Buckeye Water and Hydraulic Mining Company, having secured the water-right of Stewart's Fork and its main southern tributaries, surveyed the route of a ditch for conveying the water upon Buckeye Mountain and other auriferous gravel-banks in the vicinity. Some preliminary labor was done on the ditch in the fol-

lowing summer. Last year work was resumed, and with such energy has it since been prosecuted that a section covering nearly twenty miles has been finished on a scale amply sufficient to carry 2,000 inches of water to its lower terminus at Boalt's Hill. This locality, which is included within the company's extensive possessions, is famed for the great quantities of gold-dust gathered there in days gone by, and it is expected by all old residents that the coming clean-ups of the company will give extraordinary results. Before water was delivered on this claim, it had been furnished with Little Giants, under-currents, and other hydraulic appliances of the most approved models, Captain Atkins, the superintendent of the work, having, perhaps, had as much experience in this department of mining as any other man in the State. Washing has just been commenced here, and the water being run through large-sized nozzles under a pressure of 300 feet, does great execution. During the coming summer this company will extend its ditch about ten miles farther up into the mountains, carrying it to Stewart's Fork, its principal source of future supply. It is now fed mainly by Van Matre Creek, a confluent of that stream. It is intended, also, very soon to enlarge the ditch to the capacity of 8,000 or 10,000 inches, a quantity of water which can be commanded under the several franchises for two-thirds of the year. This water would be drawn from the contributing sources in the proportions following: Stewart's Fork, 5,000 inches; Owen's Creek, 2,000 inches; Van Matre Creek, 1,200 inches, and other smaller streams 300 inches, making a total of 8,500 inches. The whole of this water the company will use in washing its own gravel, which has an average depth of 300 or 400 feet, reaching in some places twice that depth, and generally prospecting well in gold, Boalt's Hill and some other portions of their ground having always ranked among the rich spots of Trinity County. So deep and widespread are the banks of pay-gravel in this neighborhood, that this amount of water played steadily upon them will be insufficient to cause their sensible diminution in a decade of years.

During the summer of 1875 the firm of Blythe & Bixby, having secured the right to the waters of Coffee Creek, a large branch of Trinity River, in the northeast part of the county, proceeded to survey the route for a canal designed to carry this water as far as Weaver Basin, supplying Trinity Centre and many other mining localities along its line. Fifteen miles along the line were cleared of brush and some grading was done last year, it being the intention of the projectors to commence the work of excavation as early as practicable in the present season, and thereafter to press it with the utmost expedition. For the first fifteen miles this ditch will have the unusual dimensions of 12 feet on the top and 8 on the bottom, being 6 feet in depth, giving it capacity to carry at the start 20,000 inches of water, which quantity it is expected may be increased to 26,000 inches when the banks have settled and become solid. This section will be built during the coming summer, the ditch being next year extended to Weaver Basin, thirty miles further, to which point it will bring 12,000 inches of water. The grade will be high enough to carry it over all intervening divides, while strong iron pipes will be employed to convey the water across the deeper ravines encountered along its course. When the first ten miles are finished the water from Coffee Creek will be turned into the ditch, leaving dry the bed of that stream, which will then be worked for the gold it contains. If found as rich as expected, this will be first worked out, after which the high-lying bars along its banks will be attacked, these being known to

abound in gold. The total cost of this undertaking is estimated at \$600,000, two years being required to bring it to full completion.

Among the more noteworthy events transpiring in this county during the year may be enumerated the opening of rich cinnabar deposits discovered some time before. The ore found here is said to be mostly of high grade, and as it appears to occur in compact and regular veins, seems likely to hold well in depth. The claim of the Altoona Company, the most extensively developed, and thus far the most productive and promising in the district, is described on a preceding page in the earlier part of this chapter.

While the hydraulic miners of Trinity suffered in common with those in other parts of the State from the prevailing water-dearth, those engaged in river-bed mining, here largely pursued, experienced a successful season; the causes that worked to the detriment of the former having favored the latter class by producing a low stage of water in the streams where their operations are carried on. As this branch of mining is mostly in the hands of the Chinese, it is impossible to say what their individual earnings or the aggregate production from this source may have been, though no doubt it was much larger than usual. Although auriferous quartz-lodes were known to abound in this county, not much attention was paid to them until 1874. In that year the cropings of some of these lodes situated in the vicinity of the rugged eminence known as Bullychop Mountain, having on more careful examination proved to be pretty well charged with free gold, a good many claims were there taken up. On some of these a considerable amount of work has since been done, and generally with encouraging results. A small quartz-mill has been put up here, which, should it meet with the success anticipated, will probably soon be followed by others, nor would it be cause for surprise should Trinity come in the course of a few years to rank among the active vein-mining counties of California.

CHAPTER II.

NEVADA.

This State, which for several years past has excelled all others in the production of the precious metals, has during the last year recorded an increase over the production of 1874 of more than \$5,000,000. This large increase is mainly due to the further development of the enormous ore-body met with in the Comstock lode, and its energetic extraction by the Virginia Consolidated and Ophir Companies; but also in a certain degree to other very favorable discoveries and large shipments of product from several "outside districts." Notable among these are Cornucopia district, in Elko County, various districts in Nye County, and the Northern Belle Mine in Esmeralda County.

At the end of the year the prospects for 1876 were very promising in the majority of the districts. On the Comstock, the Virginia Consolidated and Ophir were in position to extract rich ores more rapidly than ever before; the California, which contains a part of the "Big Bonanza," more valuable, perhaps, than the portion in the Virginia Consolidated, was prepared to begin the extraction of ores at a rate unprecedented heretofore; excellent prospects of ore-bodies had been found in several others of the Comstock claims; a large and very valuable ore-body had been found in the Eberhardt and Aurora ground in White Pine at a depth not before explored; the Tybo, Jefferson, Reese River, and Cornucopia Mines were doing well, and the Northern Belle, in Esmeralda County, had exposed such a large body of ore that it was found necessary to erect a second 20-stamp mill with Stetefeldt furnace attached.

Mr. Valentine, superintendent of Wells, Fargo & Co.'s Express, who certainly enjoys the most ample opportunities for making a correct estimate of the production of Nevada, since almost all the silver and gold bullion passes through the hands of that company, reports the product for 1875 as follows:

Gold dust and bullion, by express.....	\$196, 858
Gold dust and bullion, by other conveyances	19, 685
Silver bullion, by express.....	35, 283, 193*
Ores and base bullion, by freight	4, 978, 633
Total	40, 478, 369

As nearly as possible, this may be divided as follows:

Product.	Gold.	Silver.
Gold dust and bullion.....	\$216, 543	
Silver bullion, by express.....		\$25, 353, 518
Gold in silver bullion, by express.....	9, 929, 675	
Gold in ores and base bullion, by freight.....	2, 000, 000	
Silver in ores and base bullion, by freight.....		2, 978, 633
	12, 146, 218	28, 332, 151

* This item is not strictly silver bullion, but a large part of it is bullion containing both silver and gold.

The following is the detailed report of the State controller of Nevada. His figures do not agree with those of Mr. Valentine, and cannot be expected to do so, because only mines producing over a certain amount are bound to report their product at the office of the county assessor, for the purposes of taxation, and even these, in many cases, do not report full values. The number of mines in Nevada which do not come under the provisions of the tax-laws is very great.

Statement of the proceeds of the mines of the State of Nevada for the first, second, and third quarters of 1875.

EUREKA COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Atlas	5,877		\$969,891 43
Adams Hill Consolidated Mining Company	170	1,500	10,000 84
Allen & Bertrand	14		876 84
Alforjas Mine	2	539	216 47
Buchanan & Co	6	845	4,629 04
Bugout	7	1,350	318 59
Black Hawk		1,908	76 33
Badger	2	1,140	450 26
Corless	2	1,349	195 27
Connelly	39	325	2,835 66
Coffey	10		1,774 00
Dead Broke	7	450	400 47
Ducommun	1	1,514	410 75
Diamond	3	1,533	323 97
Eureka Consolidated	37,188		1,116,709 34
Eureka		992	69 54
Evening Star	6	272	365 74
Fairview	5	1,315	376 80
Grasshopper	1	1,830	140 06
Garrison	358	632	13,500 49
Grant	5	1,914	294 71
Hamilton	2		285 80
Hall & Campbell	1	522	158 45
Ironside		1,975	101 74
Industry	20	448	1,105 89
Kentuck	44		2,812 00
Laughlin		1,738	111 38
Laura Mine		746	51 50
Lyons	5	714	268 18
Matamoras	25	310	5,366 99
Mineral Hill Company's Mines	1,570	979	40,048 27
Maria	9	1,019	796 57
Mason City	3	88	223 74
Morning Star	1	1,864	216 76
Mahogany	1	132	114 54
None Such	1	650	69 13
Oregonian	2	267	212 57
Page & Corwin		546	80 30
Poorman	10		526 40
Richmond Mining Company	22,237		1,103,536 00
Silver West	17	1,814	820 68
Smith & Co	26	176	6,430 06
Shoemaker & Lockhart	2	1,480	599 99
Stanton		1,408	115 01
Tyndal	4	800	332 91
Williams	8	645	714 19
Total	67,709	1,729	2,588,675 67

134 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

ESMERALDA COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Brown Hope	430		\$13,886 52
Bowers	2	500	162 66
Columbia	4	500	382 35
Death Valley	23	1,500	2,176 00
Indian Queen	499		79,984 00
Litzen	1		132 51
Lida Valley	4		1,295 96
Montesuma	3	250	372 21
Mount Diablo	162	1,000	9,700 48
Midas	60		1,620 00
Mersach	3	1,000	839 00
Martin	8	1,000	995 31
Northern Belle	6,982	1,088	541,102 32
Pascal Burges	2	666	495 04
Remas	15	500	2,691 09
Scott		226	63 99
Sotro	2	500	403 14
Simonson	1	1,500	193 14
Travis	61	1,000	5,897 31
Thatcher	1	1,500	197 90
Whitton	3	1,500	370 33
Willson	37	500	1,806 11
Wheeler Company	1,037		1,637 22
Welsh & O'Keefe	5	1,000	930 17
Total	9,352	1,790	670,334 76

TAILINGS.

Brown Hope	100		1,801 00
Sweet Apple	700		3,400 00
Total	800		5,401 00

BORAX.

Pacific Company	165		16,500 00
Smith Brothers	830		105,765 00
Total	995		122,265 00

CHURCHILL COUNTY.

BORAX.

Nevada Soda Company	218		3,270 00
Total	218		3,270 00

ELKO COUNTY.

ORES.

Leopard Mining Company	1,496		173,420 75
Mineral Hill Silver-Mining Company	3,690	979	104,730 56
Young America	250		7,000 00
Total	5,636	979	283,151 31

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

HUMBOLDT COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Arizona Silver Mining Company	2,360	1,500	\$60,016 00
Badger Mining Company	127	.....	1,270 00
Humboldt Mill and Mining Company	224	.....	14,540 00
Jersey Mining Company	196	.....	19,784 00
Luna	32	1,720	2,673 73
O. M. Evans	300	.....	12,000 00
Oakland Gold and Silver Mining Company	300	.....	6,000 00
Rye Patch Mill and Mining Company	655	1,320	51,824 00
Total	4,456	540	168,107 73

TAILINGS.

Arizona Gold and Silver Mining Company	1,460	.....	8,100 00
Humboldt Mill and Mining Company	160	.....	640 00
Rye Patch Mill and Mining Company	440	1,167	5,340 64
Total	2,060	1,167	14,080 64

SULPHUR.

Humboldt Sulphur Company	300	.....	12,600 00
Total	300	.....	12,600 00

LYON COUNTY.

ORES.

Cremor	100	.....	800 00
Dayton Gold and Silver Mining Company	1,200	.....	20,599 83
Santiago	300	.....	3,700 00
Total	1,600	.....	24,699 83

TAILINGS.

Dorwin, G. W.	198	.....	3,148 00
Excelsior Mill	1,497	.....	8,498 17
Eureka Mill	2,500	.....	36,000 00
French & Co	241	.....	3,524 00
Humphreys, D. W.	400	.....	5,850 00
Hearse, M. A.	123	.....	1,254 00
Hayes, Louis	108	.....	580 95
Keystone Mill	400	.....	3,673 61
Kelsey Mill	1,000	.....	4,000 00
Lyon Mill and Mining Company	37,017	.....	126,671 97
Woodworth Mill	4,000	.....	40,000 00
Total	47,484	.....	233,200 70

136 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

LANDER COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Arthur.....	4	1,950	\$620 58
Bliss.....	6	1,975	885 21
Beefsteak.....	2	372	337 57
Bozet.....	3	440	651 23
Battle Mountain Mining Company.....	572	171	58,719 C3
Boowawa.....	4	390	1,649 30
Bowen & Co.....	1	1,070	65 90
Canadian.....	1	1,650	229 16
Clifford.....	1	350	146 99
Cook.....	2	400	297 71
Casamayo.....	2	310	198 92
Cooper.....	15	1,616	4,463 63
Chase.....	13	1,940	2,511 05
Dunn.....	1	930	109 52
Dougherty.....	1	830	167 63
Dollarhide.....	1	1,890	174 20
Defiance.....	99	1,270	25,793 78
Eagle.....	55	1,730	5,000 00
Eclipse.....	11	1,730	3,587 60
Engstrom.....	9	1,829	2,000 88
Ensign.....	2	1,900	107 80
Emery.....	1	1,900	85 60
Ford & Co.....	4	1,130	419 00
Fannie.....	1	1,580	104 51
Finnegan.....	12	840	2,979 18
Florida.....	41	1,784	5,499 21
Freehold.....	24	80	2,084 19
Grove Tunnel.....	69	1,732	22,511 21
Goss Bros.....	9	1,370	1,534 92
Gates & Co.....	13	750	99 23
Girard.....	13	790	6,363 58
Goodwin.....	1	1,010	1,459 09
Gill.....	1	1,190	294 58
Grasshopper.....	1	1,350	55 65
Genoa.....	2	1,436	866 35
Hill.....	4	620	590 17
Harris.....	1	1,160	113 15
Hayter.....	5	1,050	500 00
Homestake.....	1	1,300	236 80
Jamison.....	1	1,948	203 96
Jackscrew.....	87	1,966	24,063 85
J. A. Blossom.....	19	1,000	796 00
Keneally.....	1	770	128 88
Lynch.....	1	150	136 21
Lee & Co.....	15	1,470	4,054 62
Lund & Co.....	3	60	702 77
Lone Star.....	6	1,330	1,295 71
Mohawk.....	1	1,720	411 00
Morris & Cable.....	90	1,700	21,958 92
Manhattan Silver Mining Company.....	3,674	450	450,333 64
Moss Bros.....	30	1,050	2,339 13
McAfee.....	1	1,540	281 31
Mount Pleasant.....	1	1,190	47 84
Magnolia.....	4	1,940	841 63
North River.....	11	162	2,916 05
Osborn.....	3	1,310	406 43
Ockaw.....	2	1,470	433 50
Nevada Boy.....	45	210	7,493 25
Patriot.....	26	1,180	5,764 81
Pacific Mining Company.....	13	240	1,216 37
Razor Blade.....	1	990	421 90
Reed Tunnel.....	6	1,102	2,368 11
Sinnott.....	4	540	869 94
Sloan.....	9	1,870	1,267 30
Schoof.....	3	800	844 30
Sonball & Co.....	12	1,850	2,455 50
Semanthe.....	3	1,240	788 24
Stranger.....	34	1,560	2,686 29
Sonoma.....	25	1,490	3,030 61
Sundry mines.....	78	1,268	16,728 55
True Blue.....	4	1,740	635 44
Warren.....	5	1,470	1,036 60
Whitlach.....	29	18	5,603 73
Williamson.....	2	1,710	874 30
Yankee Blade.....	17	1,150	2,286 15
Total.....	5,301	1,879	721,407 25

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

LANDER COUNTY—Continued.

TAILINGS.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Manhattan Mill	20	.....	\$274 26
Total	20	.....	274 26

LINCOLN COUNTY.

ORES.

Alps.....	239	1,741	32,554 96
American Flag.....	263	270	8,191 83
Chasco.....	3	75	604 00
Chapman.....	64	1,000	5,470 30
Chief of the Hill.....	77	1,420	6,445 80
Deadmons.....	7	111	196 56
George May.....	23	1,300	1,180 00
Great Eastern.....	13	500	1,171 28
Havana.....	7	850	366 65
Hercules.....	195	.....	1,950 00
Huhn & Hunt.....	133	.....	3,108 62
Ivanhoe.....	22	1,544	1,239 82
Jolly Traveller.....	16	1,500	316 00
Kentuck.....	19	600	523 00
Monte del Rey.....	3	1,017	163 84
Mary Haynes.....	10	223	431 19
Montgomery.....	48	1,079	3,283 83
Meadow Valley.....	225	611	102,735 31
Newark.....	802	828	21,661 73
National.....	11	1,500	775 14
Ontario.....	54	333	3,456 41
Pischo.....	58	223	6,308 49
Pischo West.....	39	.....	1,280 00
Raymond & Ely.....	6,817	1,740	334,605 15
Spring Mound.....	44	.....	1,923 00
Sunny South.....	9	1,081	308 00
Towne & Orr.....	6	1,200	119 25
Vermilion.....	18	498	624 00
Washington and Creole.....	78	395	6,207 91
Total	9,906	1,772	547,974 69

TAILINGS.

Floral Mill.....	340	.....	1,700 00
Magnet.....	2,500	.....	8,495 00
Newark Manufacturing Company.....	1,300	.....	10,155 58
Raymond & Ely.....	13,681	.....	72,170 17
Total	17,821	.....	92,520 75

NYE COUNTY.

ORES.

Austin.....	9	290	3,656 80
Belmont Mining Company.....	947	1,115	64,560 29
Barnee and Clark.....	5	1,700	1,900 00
Barren & Co.....	4	1,357	1,291 20
Barcelona.....	8	414	2,484 74
Carillo.....	5	1,378	1,255 56
Creole.....	.....	1,330	196 03
Cook.....	8	1,450	2,094 65
Camack.....	5	1,060	861 70
Copper.....	.....	1,500	78 50
Downey.....	9	1,790	965 80
Dean.....	1	1,030	11 89
Gila Silver Mining Company.....	897	780	213,797 49
Gavin & Co.....	.....	1,905	126 88

138 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

NYE COUNTY—Continued.

ORES—Continued.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Glover & Dehn	1	335	\$968 46
Hayter, F. M.	23	1, 901	2, 033 58
Hathaway	4	25	890 80
Hall, G. C.	1	710	405 26
Helvis	2	1, 303	46 65
Jefferson Mining Company	2, 960	1, 296	124, 089 24
Johnson & Co.	21	1, 649	2, 556 40
Lopez	8	289	715 51
Ludwig	1	1, 500	66 20
Munro	1	40	150 35
McPherson	3	1, 470	445 80
Morey Mining Company	108	1, 243	9, 299 95
Monitor	2	1, 387	1, 223 56
McCormack	10	1, 713	2, 667 76
Mitchell .....	.....	938	150 78
Malone & Caruthers	15	1, 951	2, 365 72
Nelson	1	594	53 73
Oder	2	1, 814	668 35
Omond	5	1, 808	945 15
Prussian Gold and Silver Mining Company	3, 833	2, 325	66, 604 77
Phillips	1	1, 050	367 91
Peck, O. O.	2	1, 314	391 65
Redman & Hart	1	930	152 22
Stowe	3	990	420 92
Spaulding .....	.....	1, 620	137 00
Tybo Consolidated Mining Company	2, 891	1, 500	97, 744 40
Witham	8	1, 750	1, 262 94
West .....	.....	391	134 14
Webber	3	180	535 00
Welch	2	50	218 23
Total	11, 638	1, 484	610, 306 01

TAILINGS.

Jefferson Silver Mining Company	2, 454	.....	28, 411 54
Total	2, 454	.....	28, 411 54

STOREY COUNTY.

ORES.

Andes	876	.....	16, 425 00
Bowers	955	.....	10, 950 00
Belcher Mining Company	93, 512	.....	2, 324, 111 04
Crown Point	125, 617	1, 110	2, 595, 592 06
Chollar Potosi	12, 100	.....	206, 491 68
Consolidated Virginia	142, 272	1, 804	13, 710, 099 43
Empire	8, 530	.....	114, 240 00
Hale and Norcross	2, 846	250	47, 168 39
Imperial	400	.....	8, 000 00
Ophir	37, 511	1, 500	1, 263, 725 57
Woodville	1, 296	.....	16, 200 00
Total	425, 917	664	20, 373, 003 17

TAILINGS.

Express Mill	2, 600	.....	39, 579 00
Railroad Mill	8, 800	.....	90, 700 00
Stevenson, C. C.	1, 200	.....	6, 100 00
Total	12, 600	.....	136, 379 00

Note.—Mines in Storey County that pay no State tax not reported.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

WHITE PINE COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Aultman	30	.....	\$1,200 00
Alcyon	2	105	187 29
Battery	80	1,893	9,298 86
Bartlett	4	1,151	642 42
Buckeye State	42	.....	3,831 41
Caroline	2	1,760	755 61
California North	18	.....	193 50
Dictator	4	.....	720 00
Eschequer	43	970	2,408 42
Eberhart and Aurora Company	7,290	1,943	390,236 87
Frederick William the Great	130	.....	975 00
Grey Eagle	5	.....	510 00
Mazepa	1	.....	168 39
Mountain Queen	5	331	1,600 35
Mariposa	16	1,500	1,675 00
Joker .....	.....	1,676	102 00
Oro	149	.....	941 00
Paymaster	142	.....	16,010 00
Robert Emmett	24	1,600	297 10
Rosene	154	190	33,354 28
Stafford	10	160	393 37
San José	2,036	.....	27,297 53
Star	691	.....	64,478 10
South Aurora	5	446	1,391 48
Silver Plate	19	1,300	1,140 02
Trench	4	1,080	1,464 65
Tickup	387	583	37,761 07
Vulcan	5	.....	1,103 00
Whippoorwill	10	1,500	376 00
Total	11,247	188	600,511 72

RECAPITULATION.

ORES.

Name of county.	Quantity.		Value.
	Tons.	Pounds.	
Eureka	67,709	1,790	\$2,588,675 67
Emeralda	9,352	1,790	670,334 76
Elko	5,636	979	223,151 31
Humboldt	4,456	540	168,107 73
Lyon	1,600	.....	24,699 83
Lander	5,301	1,879	721,407 25
Lincoln	9,906	1,772	547,974 69
Nye	11,838	1,484	610,306 01
Storey	425,917	664	20,373,003 17
White Pine	11,247	188	600,511 72
Total	552,967	1,025	26,588,172 14

TAILINGS.

Emeralda	800	.....	5,401 00
Humboldt	2,060	1,167	14,080 64
Lyon	47,484	.....	233,900 70
Lander	20	.....	274 26
Lincoln	17,891	.....	92,520 75
Nye	2,454	.....	22,411 54
Storey	12,600	.....	136,379 00
Total	83,239	1,167	510,267 89

140 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

RECAPITULATION—Continued.

BORAX.

Name of county.	Quantity.		Value.
	Tons.	Pounds.	
Churchill.....	218	.....	\$3,270 00
Esmeralda.....	995	.....	122,365 00
Total.....	1,213	.....	125,535 00

SULPHUR.

Humboldt.....	300	.....	12,600 00
Total.....	300	.....	12,600 00

Statement of the proceeds of the mines of the State of Nevada for the fourth quarter of 1875.

EUREKA COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Atlas.....	784	.....	\$41,500 00
Allen.....	5	.....	251 32
Adams' Hill.....	154	.....	9,032 31
Beebe & Sanchez.....	5	.....	436 40
Boulder.....	7	.....	333 44
Cassidy & Co.....	11	.....	1,191 50
Erie.....	2	1,200	223 68
El Dorado.....	24	.....	3,352 06
Geddes & Bertrand.....	450	.....	45,000 00
Garrison.....	134	.....	7,773 00
Hoosac.....	2	.....	124 07
Jenny Lind.....	3	1,600	210 89
K. K. Consolidated.....	2,089	1,000	95,051 00
Laura.....	2	961	256 64
Laraway.....	9	.....	881 60
Mountain Boy.....	21	.....	3,058 54
Morning Glory.....	55	.....	8,299 91
Mason City.....	9	1,200	740 53
Mountain View.....	11	.....	1,507 25
Otho.....	6	1,126	429 76
Richmond Consolidated Mining Company.....	9,957	.....	340,371 00
Stella.....	4	1,050	332 59
Stramboul.....	16	.....	1,060 94
Total fourth quarter 1875.....	13,764	737	561,419 43

ESMERALDA COUNTY.

ORES.

Indian Queen.....	397	1,000	52,698 96
Midas.....	63	1,000	1,141 43
Mount Diablo.....	167	1,800	9,731 13
Northern Belle.....	3,748	.....	296,648 96
Wm. Brannon.....	6	400	899 94
Wheeler.....	312	.....	8,756 45
Willis & Milsap.....	83	.....	497 75
Wilson.....	110	.....	1,852 00
Total fourth quarter 1875.....	4,887	200	373,296 62

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

ESMERALDA COUNTY—Continued.

BORAX.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Pacific Borax Company	119	.....	\$11,900 00
Smith Bros. Borax Works	338	.....	33,800 00
Total fourth quarter 1875.....	457	.....	45,700 00

ELKO COUNTY.

ORES.

Leopard.....	1,600	.....	226,879 00
Mineral Hill Mining Company	480	.....	14,283 71
Spencer Mine	8	692	933 00
Austin Mine	17	893	1,356 00
Total fourth quarter 1875.....	2,105	1,585	243,451 71

HUMBOLDT COUNTY.

ORES.

Arizona Silver-Mining Company.....	676	.....	18,923 00
Badger Mine	57	1,000	679 00
Humboldt Mill and Mining Company	139	.....	5,786 00
Rye Patch Mine	74	648	12,996 95
Total fourth quarter 1875.....	946	1,648	38,389 95

TAILINGS.

Arizona Silver-Mining Company....	2,850	.....	19,950 00
Humboldt Mill and Mining Company.....	300	.....	1,500 00
Rye Patch Mine	700	.....	6,328 00
Total fourth quarter 1875.....	3,850	.....	27,778 00

LYON COUNTY.

ORES.

Silver City Mining Company.....	46	.....	1,426 00
Total fourth quarter 1875.....	46	.....	1,426 00

TAILINGS.

Dorwin, G. W.	170	.....	2,550 00
Excelsior Mill	300	.....	1,263 00
French Greeley	150	.....	1,200 00
Hayes, Lewis	13	.....	135 00
Humphries, D. M.	50	.....	750 00
Lyon Mill and Mining Company	12,491	.....	47,245 68
Union Mill and Mining Company	1,500	.....	21,215 16
Woodworth Mill	4,000	.....	40,000 00
Total fourth quarter 1875.....	18,674	.....	114,358 84

142 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines of the State of Nevada, &c.—Continued.

LINCOLN COUNTY.

ORES.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Alps Mining Company.....	137	25	\$10,448 30
Anna.....	4		250 00
Bay State.....	22	1,500	549 75
Great Eastern.....	14		941 21
Lehigh.....	60		6,014 70
Meadow Valley Mining Company.....	430	1,796	43,230 00
Portland.....	7	334	221 37
Pioche.....	16	930	1,510 87
Newark.....	12	580	737 57
Pea Vine.....	5	690	539 08
J. R. James.....	872	1,558	18,450 44
Raymond & Ely Mining Company.....	5,611	330	284,597 06
Total fourth quarter 1875.....	7,201	1,183	367,790 41

TAILINGS

J. A. Bidwell.....	171		885 00
A. J. Blair.....	15		340 32
J. P. Kelly.....	3,617		10,905 21
Total fourth quarter 1875.....	3,803		12,130 53

LANDER COUNTY.

ORES.

Allen & Co.....		1,080	154 70
Beowawa.....	4	820	877 80
Bothin, J. C.....		1,390	50 66
Bozet, George.....	1	1,380	177 96
Battle Mountain Mining Company.....	98	1,918	10,961 99
Bowman Dump.....	1	230	112 10
Cheek, James.....		1,430	50 34
Casey & Co.....	2	1,570	403 14
Campbell, John.....		710	18 74
Cooper, H. H.....	1	1,030	905 67
Collins, John.....		770	611 47
Centennial Mine.....	3	180	901 05
Defiance.....	102	530	29,385 15
Dale.....	4	390	923 68
Dollarhide.....		1,874	288 38
Eclipse.....	7	40	1,261 92
Esther.....	2	650	449 90
Freehold.....	2	100	108 24
Grove Tunnel.....	29	30	6,698 60
Goodwin.....		1,490	94 50
Good Hope.....	4	1,980	2,941 94
Hill & Reed.....	1	850	406 34
Horton & Sawtelle.....		190	139 74
Jackscrew.....	3	170	454 90
Last Hope.....	1	80	125 44
Lone Star.....	2	1,940	512 26
Lee & Lund.....	11	910	2,060 55
Ludolph & Co.....	4	1,968	937 40
Manhattan Dump.....	22	32	2,553 38
Morris & Cable.....	17	750	5,349 00
Mullen, George.....	5	70	1,263 50
Moss Brothers.....	4	1,790	621 40
Manhattan Silver-Mining Company.....	1,145	1,750	152,386 29
Nevada Boy.....	8	330	1,410 20
North River.....	1	240	431 44
Old Well.....	1	1,970	143 10
Osborne.....	1	400	120 64
Occidental.....	15	1,650	5,748 31
O'Kane.....	2	1,370	256 40
Patriot.....	11	1,040	6,037 70
Pacific.....	1	1,270	232 16
Pierce.....		820	56 15
Rudolf.....		850	104 10

Statement of the proceeds of the mines in the State of Nevada, &c.—Continued.

LANDER COUNTY—Continued.

ORES—Continued.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Richardson, J .....	.....	720	\$35 20
Sinnot	2	1,740	290 74
Stumton	3	150	460 90
Schoof, Louis	2	1,060	254 40
Southall & Co	5	1,090	795 80
Sidnor .....	.....	1,050	61 22
True Blue	5	130	543 64
Troxel	4	1,500	516 55
Turner Bros	5	896	1,415 10
Warren & Co	13	800	2,925 95
Whitlach	3	1,340	466 65
White & Shiloh	437	576	37,109 12
Other mines	10	730	1,939 31
Total fourth quarter 1875	2,029	1,764	284,542 17

NYE COUNTY.

ORES.

Altosano .....	.....	360	46 36
Barnes & Clark	2	7 0	670 44
Blackiston & Richards	1	352	222 55
Belmont Mining Company	8	1,118	2,494 61
Dayton, J. B.	900	.....	16,517 11
Gibson & Co.	3	1,560	660 25
Hutchings & Graves	4	110	673 44
Hanchett, L. J.	220	890	14,862 00
Hoel, C. ....	.....	1,000	61 04
Love, G. J.	1	1,230	288 19
Morton, J. C.	1	1,425	273 30
Mollison	6	1,380	671 53
Other mines	27	1,092	3,296 69
Peck & Wood	1	1,327	378 37
Reynolds & Co	2	1,770	566 50
Rhodes, M. G.	497	1,719	70,055 10
Savolan	1	1,891	506 02
Tybo Consolidated Mining Company	2,041	.....	78,771 52
Vaughn	2	1,986	165 68
Witham	1	1,600	262 36
Total fourth quarter 1875	3,728	1,434	190,985 08

TAILINGS.

Hanchett, L. J.	372	740	5,368 00
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STOREY COUNTY.

ORES.

Belcher Mining Company	30,268		999,762 51
Chollar Potosi Mining Company	6,750		110,890 64
Crown Point Mining Company	29,742	1,666	506,010 70
Consolidated Virginia Mining Company	26,792	.....	3,205,006 92
Empire Mining Company	2,560	.....	32,720 00
Hale and Norcross Mining Company	2,950	1,100	51,554 20
Imperial Mining Company	2,727	850	74,005 55
Justice Mining Company	729	500	16,865 78
Ophir Mining Company	9,169	1,500	419,264 98
Vivian Mining Company	1,488	.....	23,397 00
Yellow Jacket Mining Company	761	.....	12,176 00
Total fourth quarter 1875	113,938	1,610	5,452,554 37

144 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Statement of the proceeds of the mines in the State of Nevada—Continued.

STOREY COUNTY—Continued.

TAILINGS.

Name of mine or owner.	Quantity.		Value.
	Tons.	Pounds.	
Express Mill	1,800	.....	\$17,100 00
Railroad Mill	4,000	.....	44,000 00
Total fourth quarter 1875	5,800	.....	.61,100 00

WHITE PINE COUNTY.

ORES.

Alcyone	36	1,124	1,000 00
Boston	8	1,124	378 32
Buckeye State	40	.....	593 33
Consburg	1	1,500	84 00
Dewitt	8	661	643 20
Eberhardt and Aurora	3,895	1,730	226,578 51
Elko	33	1,289	1,526 69
Fay	72	102	5,040 74
Kellogg	1	488	272 53
Mahogany	18	1,881	832 10
Mountain Queen	1	1,808	429 47
Newark Company	11	62	790 18
Pacific	68	148	4,586 14
Peterson	1	1,940	157 03
Paymaster	41	.....	9,734 80
Prince	8	1,250	810 00
Queen	1	604	204 08
Rescue	29	919	3,400 36
South Aurora	4	210	608 69
Spaulding	1	1,050	273 32
Stafford	6	1,950	709 65
Tickup	251	.....	15,060 00
Total fourth quarter 1875	4,543	1,840	273,703 34

RECAPITULATION.

ORES.

Eureka	13,764	737	561,419 43
Esmeralda	4,287	200	373,226 62
Elko	2,105	1,585	243,451 71
Humboldt	946	1,648	38,389 95
Lyon	46	.....	1,426 00
Lincoln	7,201	1,183	367,790 41
Lander	2,029	1,764	284,542 17
Nye	3,728	1,474	190,985 08
Storey	113,938	1,610	5,452,554 37
White Pine	4,543	1,840	273,703 34
Total fourth quarter 1875	153,193	1	7,767,469 08

TAILINGS.

Humboldt	3,850	.....	27,778 00
Lyon	18,674	.....	114,358 84
Lincoln	3,803	.....	12,130 53
Nye	312	740	5,368 00
Storey	5,800	.....	61,100 00
Total fourth quarter 1875	32,499	740	220,735 37

BORAX.

Esmeralda	457	.....	45,700 00
Total fourth quarter 1875	457	.....	45,700 00

Total production of gold and silver for the year 1875.

ORES.

Name of county.	Quantity.		Value.
	<i>Tons.</i>	<i>Pounds.</i>	
Eureka.....	81,474	466	\$3,150,095 10
Esmeralda.....	14,239	1,990	1,043,561 38
Elko.....	7,742	584	526,603 02
Humboldt.....	5,403	188	206,497 68
Lyon.....	1,646	.....	26,125 83
Lander.....	7,331	1,643	1,005,949 43
Lincoln.....	17,108	935	915,765 10
Nye.....	15,567	918	801,291 09
Storey.....	539,856	274	25,825,557 54
White Pine.....	15,791	28	874,215 06
Total.....	706,160	1,026	34,375,661 22

TAILINGS.

Esmeralda.....	800	.....	5,401 09
Humboldt.....	5,910	1,167	41,858 64
Lyon.....	66,158	.....	347,559 54
Lander.....	20	.....	274 28
Lincoln.....	21,624	.....	104,651 28
Nye.....	2,886	740	33,779 54
Storey.....	18,400	.....	197,479 00
Total.....	115,738	1,907	731,003 26

SUMMARY.

Ore.....	706,160	1,026	34,375,661 22
Tailings.....	115,738	1,907	731,000 28
Grand total.....	821,899	933	35,106,664 48

PRODUCTION OF BORAX.

Churchill County, tons.....	218	\$3,270
Esmeralda County, tons.....	1,452	\$167,965
Total, tons.....	1,670	\$171,235

PRODUCTION OF SULPHUR.

Humboldt County, tons.....	300	\$12,600
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THE COMSTOCK MINES.

I am indebted for the details of work done at most of the mines on the Comstock lode during the year to Mr. F. F. Osbiston, superintendent of the Savage Mine, who has been assisted by the courtesy of other superintendents. In this connection, reference should be made to the interesting account of the "Great Bonanza" by Professor Rogers, published in the last report of the Director of the Mint, and accompanied with copies of the surveys of the deepest level upon which operations have been conducted.

The product of the Comstock mines in 1875, as reported to me by the State controller, was as follows:

Number of tons mined.....	539,856
Number of tons of tailings worked.....	18,400

Total tons..... 558,256

Total bullion product, ore.....	\$25,825,557 54
Total bullion product, tailings.....	197,479 00

26,023,036 54

Of this amount the leading mines have produced as follows :

Consolidated Virginia	\$16,957,538 00
Ophir	1,817,187 00
Crown Point.....	3,124,052 00
Belcher	3,107,993 00
All others	1,016,266 54

26,023,036 54

The following is a summary of the operations at each mine, taken in the order of position from north to south :

Utah.—The vertical depth of the new shaft is 517 feet; drifts have been run north and south the entire length of the claim, finding the vein perfect and over 100 feet in width, containing low-grade ore, but not of sufficient value to mill. Nothing has been done from the bottom of the shaft owing to the destruction of the works by fire in August last and the consequent filling up of the shaft with water. Since then, new works have been erected at a cost of \$100,000; the work of pumping out the water is now being carried on, and in a short time prospecting will be resumed.

The above was furnished by Mr. James S. Fair, the superintendent.

Sierra Nevada.—No ore has been extracted from this mine during the year 1875. Great energy has been exerted to open up the mine at a greater depth. The surface-ore was so favorable and the vein so perfect, that the proprietors are now expending large amounts of money in sinking both new and old shafts and otherwise opening the mine to a much greater depth. During the year the old shaft has been sunk 125 feet, making total depth 895 feet, and the new one has now attained a vertical depth of 1,450 feet. On the 1,000-foot level a west drift has been run 450 feet. On the 1,250-foot level another drift has been run 200 feet west and also one 400 feet north and south of shaft. The cross-cuts on both levels show great improvements in the quality of the quartz. The estimated value of the improvements (machinery, hoisting-works, &c.) is \$300,000. Number of feet in claim, 3,600.

For these facts I am indebted to Mr. W. T. Wright, the superintendent.

Union Consolidated.—This mine has no hoisting-works, and is being prospected through the Ophir Company's shaft. A drift has been run north the whole length of the claim on the 1,300-foot level, and necessary cross-cuts made, without developing ore of any particular value. Number of feet in claim is 825. Heavy machinery will be erected this year.

Mexican.—Like the Union Consolidated, this mine has no works, and is prospected through the Ophir shaft. A north drift has been run the length of the claim and cross-cuts made, with the same results as in the preceding mine. Machinery will also be erected on this claim at an early date. Number of feet in claim is 600, being a segregation of the north end of the Ophir Mine.

Mr. Samuel T. Curtis, superintendent of the Union Consolidated and the Mexican, communicated the above facts.

Ophir.—The greatest production of this mine heretofore was during the year 1863, \$1,514,222.21, while this year it is \$1,817,187.19. But with this encouraging outlook, and in the midst of the company's greatest prosperity, while upon the eve of resuming dividends, the dire disaster of fire overwhelmed it, laying its valuable and costly works in ruins and stopping all operations for more than a month. Works as

fine as had ever been erected on any mine had recently been completed at a cost of over three hundred thousand dollars, and the mine was in fine working condition in all its parts, when the fire of October 26 occurred, sweeping off everything consumable, and irreparably damaging a great portion of the machinery. In just one month's time, however, by extraordinary exertions and superior management, Superintendent Curtis had the buildings and works replaced and again ready for hoisting. But after overcoming these serious difficulties yet another disaster had to be met, viz, the flooding of the mine up to the 1,500-foot station, with more or less slight caves from drift-facings, by which there was, no doubt, lost much good ore by being mixed with worthless *débris*, rendering it unfit for milling.

It is encouraging to notice that during the last five months (as will be seen hereafter) the yield, per ton, of ore has largely increased—from \$26.94 to \$58.54. It is true the assay-value of the ore increased rapidly at the same time, but not in the same proportion as the yield. This points to more tractable ore than was formerly found in the mine.

Mr. S. T. Curtis, the superintendent of the mine, reports at the end of the fiscal year as follows:

During the fiscal year, up to October 26, the date of destruction of the works, 51,322 $\frac{3}{4}$ tons of ore have been extracted; which, together with 105 $\frac{3}{4}$ tons on hand at mills at the commencement of the year, have yielded bullion amounting to \$1,817,187.19.

During the year a large amount of prospecting has been done on the different levels, several air channels and winzes constructed, making the mine very cool, and producing beneficial results in the increased facilities afforded the miners to work.

The main vertical shaft has been sunk 125 feet, and the upper 400 feet retimbered, before and after the fire. A large station has been cut out on the 1,600-foot level, preparatory to sinking inclined shaft.

The prospecting on the lowest level (1,700-foot) discloses in the west cross-cuts a great disturbance of the west wall of the lode, and the eastern cross-cuts, as far as they have penetrated, have passed through "horses" or masses of west country-rock and entered more favorable formation with strata of low-grade ore following out east, which evinces a "heave" or pushing of the ore-vein, and gives hopes of discovery of ore-deposits on this level farther east.

The ore-bodies on the 1,300-foot level show strength in raising, and the angle of raise proves that the long abandoned 1,100 and 700 foot stations were not prospected far enough east by from three to five hundred feet, if the ore-bodies discovered on the 1,300-foot level raise that high. Two months ago I started a drift southeast from the 1,100 station to test this theory, the last work done in which showed signs of a favorable formation.

Very large and substantial buildings were erected, and a powerful and first-class pumping engine and gearing, incline engines and gear, and tapered reel; to the shaft of the latter were connected two hydraulic engines, worked by the water of the mine, under a pressure of 400 feet head. These hydraulic engines give an auxiliary power of 268 horse while hoisting, and in lowering form a water-balance counteracting-weight of giraffe and steel cable, and are calculated to save considerable fuel.

A large ore-house was constructed alongside of the railroad, to which the ore is to be raised by a water-elevator, using the same power as the hydraulic engines. This system of elevating the ore 47 feet to the railroad was adopted after careful consideration and perfect surveys for line of switch from railroad, which it was found would cost \$45,000 for the only practical route, whereas the hydraulic machinery costs but about \$6,000.

Two air-compressors were also put up, and compressed air introduced into the mine, which has proved serviceable and economical, running Burleigh drills, air-fans, and hoisting ore from winzes.

A very perfect system of water-works was in process of construction and partly completed at the time of the fire; a 10-inch lap-welded iron pipe had been laid up the mountain a distance of 2,000 feet, with 400 feet pressure, to a water-tank capable of holding 100,000 gallons of water; six hydrants with 2 $\frac{1}{2}$ -inch hose were laid outside the buildings, and twelve small ones with 1 $\frac{1}{4}$ -inch hose inside buildings at convenient points.

The main pipe to tank, besides being available for fire purposes, also supplies power to the hydraulic counter-balance engines connected with steam incline engines, and also

to the water-hoist in the railroad ore-house, the water of the mine being used, except in case of fire, when the water from the water-ditch can be turned into the tank through the connections.

All this powerful machinery and first-class buildings, covering an area of 39,522 square feet, and forming one of the most thorough works on the Comstock, were just completed, and three water-hydrants ready for use, when the terrible fire of the 26th of October laid in ashes nearly the whole city of Virginia in a few hours, and swept the Ophir works down in a flash of fire.

Prior to the fire the water in the ditch was very scarce, and I was unable to get water to fill the tank. Fearful of fire, from the long period of hot weather, I had taken the precaution of having extra watchmen at night. I had also put a 2½-inch pipe through the roof of main building, connecting with hose on the roof, the water being supplied by a steam force-pump. I had also been pumping water up to tank on the mountain for a couple of days and the 10-inch pipe was about half full. This water in the pipe and the hose on the roof supplied by force-pump was all the available water I had to fight fire. I blew up several buildings with giant powder around the works in hopes of saving them, but all efforts were futile. The fire came with lightning rapidity in large sheets, sweeping down the immense buildings as if by magic, and in less than five minutes they were laid on the ground a burning pile, increased by the burning of about one thousand cords of wood and nearly 400,000 feet of mining timbers and lumber. The heat was so intense that railroad car-wheels were melted in the open air alongside of the works; but taking all this into consideration, I believe I could have saved considerable property, had I had a supply of water from the ditch, and the hydrants complete as they are now.

When the fire abated, so as to permit me to get to the shaft, I found that the heavy timbers of the gallow-frame, partially burned, had fallen down the shaft, breaking a portion of the platform that had been put in to protect shaft and mine, and the fire was working its way down the shaft. During the excitement of the day and part of the night fire-engines could not be procured from town, and the fire in the shaft had to be fought with water-buckets passed by lines of men standing in the midst of the burning mass, a furious gale blowing at the time carrying showers of burning coal from our own ruins and the burning town. In the middle of the first night fire-engines were obtained, and for thirty-six hours a continuous stream of water was played down the shaft until the safety of the shaft and mine were assured.

On the day after the fire competent men were dispatched to the lumber-yards of Carson and Dutch Flat, Cal., to procure and ship timbers; machinery was telegraphed for; the new double-reel hoisting-engine and cables just completed for the combination shaft of the Chollar-Potosi, Hale & Norcross, and Savage secured, and, through the heaviest storms Virginia has seen for years, the old engine-foundations were torn out, and new ones to suit the combination engine constructed, work was prosecuted without cessation, supplies hauled a considerable distance on account of destruction of railroad tunnel and bridges, the works rebuilt and work through shaft resumed November 25, being inside of thirty days from time of destruction.

While the reconstruction of works was going on, a donkey-engine, furnished through the kindness of the Phil. Sheridan Mining Company, was put in place, with which we were enabled to retimber shaft where it had been burned to a depth of 400 feet from surface, besides hoisting considerable of the water making on the 700-foot level of the mine.

The buildings rebuilt have been made much larger, and more complete and convenient than formerly.

Most of the machinery which passed through the fire has been made available, especially the new incline and pumping engines, which suffered but little damage. From the two hoisting-engines of the vertical shaft, which received most damage, one good engine has been completed at little cost, and foundations are being laid to put in place for hoisting-power for a new compartment of the shaft, which, when completed, will give three hoisting-compartments and one pumping-compartment, and give hoisting capacity of fully 1,000 tons per day.

During the time occupied in reconstructing machinery, the water in the mine rose to 16 feet above the 1,500-foot station, but now it has been reduced by small pumps driven by compressed air and water-tanks 7 feet, and by the 18th instant the large pumping-engine will be completed and started, which will rapidly clear the mine of water and allow us to resume hoisting ore.

RECEIPTS.

Bucks shaft construction :	
Sale of material.....	\$3,556 18
Ophir Mine:	
Sale of material.....	2,422 98
Assessment No. 29.....	201,600 00

Expense assessment No. 29:		
Received for advertising charges.....		\$269 75
Insurance.....		59,000 00
Bullion account:		
Face of bullion.....	\$1,811,084 33	
Assay grains.....	6,102 86	
		1,817,187 19
Virginia and Truckee Railroad Company:		
Rebate.....		6,624 27
Union Consolidated Silver-Mining Company:		
Holisting 2,400 tons of rock.....		4,800 00
Bucks shaft building:		
Sale of lumber.....		354 80
Total receipts.....		2,095,815 17
Cash on hand December 16, 1874.....		495 07
Total.....		2,096,310 24

DISBURSEMENTS.

Ophir Mine:		
Surveying.....	\$1,250 00	
Printing.....	324 00	
Recording.....	25 75	
Virginia and Storey County taxes.....	2,306 14	
Horses and feed.....	2,897 74	
Ore-tax.....	9,110 62	
Rubber, clothing, blankets, &c.....	1,329 00	
Purchase of real estate.....	7,250 00	
Sundries.....	822 50	
		\$25,315 75
Office expense, San Francisco:		
Rent.....	1,800 00	
Stationery.....	270 33	
Stock-boards.....	625 00	
Newspapers, express charges, &c.....	261 41	
Salaries.....	8,125 00	
Lithographing and printing.....	669 50	
Fuel.....	46 00	
Carpenter's work.....	29 00	
Donation to Virginia City sufferers.....	500 00	
		12,326 24
Expense assessment No. 29:		
Amount paid for advertising.....		106 50
Insurance:		
Premiums.....		2,400 00
Bucks shaft building:		
Pay-roll.....	\$21,047 75	
Paint and painting.....	4,276 14	
Freight and hauling.....	4,183 17	
Lumber, doors, windows, nails, &c.....	27,801 30	
Hardware.....	276 75	
		57,585 11
Discount on bullion.....		80,200 06
Freight on bullion.....		1,848 10
Melting bullion.....		5,165 16
Interest.....		7,623 04
Milling.....		773,798 50
Virginia and Gold Hill Water Company:		
Water.....		5,500 00
General expense at mine:		
Salaries.....	\$8,760 00	
Stationery, telegrams, newspapers, &c.....	2,900 06	
Discount and exchange.....	7,774 12	
Fuel.....	99 00	
Donations.....	220 00	
Matting.....	38 25	
Safe.....	575 00	
		20,356 43

150 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Bucks shaft construction:

Labor	\$329, 136 35
Hardware	42, 008 84
Candles	7, 850 90
Freight	3, 854 93
Wood, lumber, and timbers	104, 042 17
Coal and charcoal	2, 728 39
Supplies, clothing, &c	3, 254 50
Surgery	1, 751 50
Foundry work	4, 205 20
Carbons and drills	6, 240 50
Wire cables	21, 916 04
Expense extinguishing fire	1, 250 00

\$528, 239 32

Bucks shaft machinery:

Labor	54, 408 68
Foundry work	24, 588 76
Hardware	10, 686 47
Oil and tallow	5, 386 93
Hauling and freight	30, 729 09
Horses and feed	154 06
Grading	2, 283 76
Engines and machinery	177, 968 74
Lime	666 50
Foundations	37, 346 92

344, 219 91

Assay-office:

Pay-roll	3, 056 00
Scales	253 81
Material	628 76

3, 968 57

Legal expense

5, 684 25

Traveling expense

900 00

Sutro Tunnel committee

415 80

Total disbursements

1, 875, 662 72

Superintendent Samuel T. Curtis:

Cash with superintendent, on superintendent's account, in excess of last year's balance

9, 393 40

Cash account:

Cash on hand December 15, 1875

211, 254 10

Total

2, 096, 310 24

Ore, shipped and worked, assay-values, and bullion returns.

Months.	Ore shipped to mill.		Ore worked.		Assay-value per ton.	Yield per ton.	Yield per cent. of assay-value.	Assay value of bullion.			Value of samples, &c.	Total yield of ore.	
	Tons.	Lbs.	Tons.	Lbs.				Gold.	Silver.	Total.			
1874.													
On hand December 1.....	105	1,340											
December.....	6,943	1,950	4,747		\$37.77	838.37	.74 8-10	\$37,413.37	\$70,135.89	\$133,569.26	\$645.51	\$134,213.77	
1875.													
January.....	3,823	1,700	4,498	900	38.63	96.34	.68 2-10	49,898.25	66,938.97	116,175.93	410.98	116,585.50	
February.....	3,377	1,900	3,353		36.17	92.18	.61 3-10	32,016.97	41,665.57	73,681.84	241.13	73,982.97	
March.....	3,897	1,750	3,183		41.70	90.36	.73 8-10	43,703.50	52,856.76	96,659.33	290.65	96,950.00	
April.....	4,064	1,650	2,764		40.90	98.17	.70	53,961.79	43,641.43	77,603.83	238.92	77,863.14	
May.....	3,731	1,700	4,372		41.31	99.05	.70	54,898.07	71,753.99	186,579.06	436.71	187,005.77	
June.....	4,938	300	4,527		40.41	96.94	.68 6-10	51,350.08	70,953.91	121,603.96	364.35	121,968.34	
July.....	5,449	700	5,100		45.84	94.83	.76	81,968.35	95,098.46	177,056.83	543.15	177,599.88	
August.....	3,051	800	4,980	1,000	55.30	43.77	.79	97,375.51	120,944.33	317,619.84	792.82	318,412.66	
September.....	4,825	4,806	4,806	1,500	66.29	53.73	.79 5-10	113,573.13	140,053.31	353,634.44	783.77	354,418.51	
October.....	7,937	835	7,885	540	56.59	49.53	.76 9-10	153,710.85	179,711.16	330,492.11	1,103.64	330,541.88	
November.....			1,344	1,000	61.58	56.54	.95	36,309.66	42,170.51	78,480.17	242.93	78,723.10	
Averages and totals.....	51,428	940	51,498	940	47.45	35.33	.74 5-10	811,096.02	990,988.31	1,811,064.33	6,102.86	1,817,187.19	

California.—Mr. James G. Fair, the superintendent, makes the following report:

During the past year the mine has been prospected as follows:

On the 1,300-foot level a drift has been run from the southern to the northern boundary, west of the ore-vein, connecting with the openings of the Ophir Mine.

Cross-cut No. 1 has been run east 213 feet on the southern boundary to the ore-vein. This drift has been extended north in the ore-vein 100 feet, connecting with the winze sunk in the ore-body to the 1,400-foot level. The ore found thus far on this 1,300-foot level has been of moderate quality, but that found in sinking the winze has been good from level to level.

On the 1,400-foot level a drift has been run west of the ore-vein the whole length of the mine connecting with the Ophir Mine on the north. Cross-cuts Nos. 1, 2, and 3 have also been extended from this drift across the ore-vein.

A lateral drift has also been run north from the southern boundary in the ore-vein 560 feet and will soon be connected with the workings of the Ophir Mine. A large amount of valuable ore is already developed on this level, but it is less regular than on the levels below.

On the 1,500-foot level a drift has been run from the southern to the northern boundary, west of the ore-vein. Cross-cuts have been run from this drift, 100 feet apart, making six in all. The ore thus developed shows a width of from 75 to 208 feet. Cross-cuts Nos. 1 and 2 have crossed the ore-vein. Cross-cuts Nos. 3, 4, 5, and 6 have not yet been extended across the ore-vein, and its width is unknown. A lateral drift has been run in the ore-vein from the southern to the northern boundary, crossing all of these cross-cuts and intercepting the openings of the Ophir Mine. The ore passed through the entire length of this drift, except the northern 70 feet, has been of exceedingly high grade, assaying for weeks during its construction \$1,000 per ton. Three double winzes have been raised in the ore-body from this level in cross-cuts Nos. 1, 2, and 3 to the 1,400-foot level, all passing through ore of excellent quality.

Four winzes have also been sunk from the lateral drift in cross-cuts Nos. 1, 2, 3, and 5 to the 1,550-foot level, all of them passing through ore of high grade the whole distance. The developments on this level disclose a very large amount of exceedingly rich ore.

On the 1,550-foot level the main drift has been extended north 400 feet from the southern boundary to cross-cut No. 5, in the ore-body, passing through exceedingly rich ore, and the face of this drift is yet in ore of this quality. This main drift intersects all of the winzes sunk from the 1,500-foot level. In cross-cut No. 1 the ore-body has been developed to a width of 130 feet, and the ore-vein is not yet crossed.

Cross-cut No. 3 has been extended 65 feet, and neither east nor west walls have yet been reached.

Cross-cut No. 5 has been developed 75 feet, and both ends of the drift are in high-grade ore, as neither the east nor west walls have yet been reached.

Between cross-cuts Nos. 2 and 3 a double winze has been sunk to the depth of 128 feet, through ore of excellent quality the entire distance, which terminates in ore of the same richness. Another winze has been sunk 320 feet south of the southern boundary to a depth of 147 feet. No cross-cuts have been run from the bottom of these winzes. The developments made by these winzes prove the continuity at these lower depths, of the same ore-body which exists on the levels above, with an appreciation in the quality of the ore, which must be of great width.

The sinking of these winzes has been temporarily discontinued on account of the increase of water and the limited means of hoisting. This difficulty will soon be obviated by the drift that is being run on the 1,700-foot level of the Consolidated Virginia Mine.

This level is but partially explored. The ore found is of better quality than that on the levels above, and there is little doubt but that the ore-body is of much greater width.

My efforts the past year have been to open the mine as thoroughly as possible on all the levels, and, at the same time, to take out as little ore as possible.

The ore thus removed (5,123½ tons) has been daily hoisted, weighed, assayed, and passed to our credit by the Consolidated Virginia Mine, we not then having the mills to reduce it.

All of the levels are connected with the Consolidated Virginia Mine on the south, and with the Ophir Mine on the north; also by the various winzes referred to, which thoroughly ventilates the mine and makes it cool and pleasant.

At the C. & C. shaft buildings complete in every respect have been erected, and machinery for pumping and hoisting has been put in place, and is now in full operation. In addition to the main building, there is a blacksmith-shop, a rope-house, two large carpenter-shops, and one machine-shop. The carpenter-shops are supplied each with an engine and machinery—one of these shops being intended for the use of the Consolidated Virginia Mine, and the other for the California mine.

The machine-shop is fitted up with engines, lathes, tools, &c., one side of which is for the use of the Consolidated Virginia Mine and the other side for the California Mine. For security against all fires, the works are surrounded by hydrants, with a good supply of fire-hose; and there is an ample supply of water under a very heavy pressure.

A large area of ground immediately surrounding the site of this shaft has been secured, having been purchased at a heavy outlay.

This shaft is situated 1,040 feet east of the Consolidated Virginia shaft.

It is now sunk with three compartments to the depth of 938 feet. The cost of this joint shaft to January 1, 1876, was \$436,183.13.

A drift is now being run east from the 1,500-foot level of the mine, which will connect with the C. & C. shaft.

It will reach that shaft and be in readiness for the transportation of ore as soon as the shaft is sunk to that depth.

Two hundred and eighty-eight feet remain to be sunk to reach this drift.

After this connection is made with the C. & C. shaft, I feel safe in saying that our hoisting capacity will be 2,000 tons per day, and as to the supply of ore we have now in sight in the mine a sufficient quantity to last for a long period.

The secretary of the California reports the following receipts and disbursements during the year :

RECEIPTS.

Amount due from Virginia office, last statement, since paid.....	\$1, 113 74
Amount due from Bank of California, last statement, since paid.....	574 12
Amount received January 18, 1876, from sale of ore.....	453, 060 46
Nevada Bank over-draft.....	28, 247 77
	482, 996 09

DISBURSEMENTS.

J. C. Flood, amount due him, since paid.....	\$80, 500 00
Freight.....	220 10
Expense.....	4, 756 42
Advertising.....	101 25
Books and stationery.....	1, 254 90
Salaries and wages.....	87, 473 50
Supplies.....	12, 745 66
Title.....	25, 000 00
Hoisting.....	2, 681 50
Contribution.....	500 00
Virginia office expense.....	210 60
Interest and exchange.....	37, 356 59
Sutro committee.....	129 00
Survey.....	600 00
Taxes.....	277 75
Legal expense.....	10, 950 00
C. & C. shaft.....	218, 091 02
Cash on hand.....	147 30
	482, 996 09

Consolidated Virginia.—This mine has been the most prosperous one on the continent during the past year. A regular monthly dividend has been paid to the stockholders, which during the last ten months has been at the rate of \$10 per share. Besides an unparalleled extraction of ore, a vast amount of exploring work has been done.

In October, the disastrous fire which destroyed the greater part of Virginia City, swept away also the extensive hoisting-works and buildings at the mine, together with a vast accumulation of supplies and the splendid 60-stamp Consolidated and California mills, the latter of which was about ready to start. This seriously affected the crushing facilities of the mine, and also compelled the stoppage of ore-extraction and nearly all underground work and bullion shipments until the hoisting-works and necessary buildings could be replaced. But in the face of the most

serious difficulties, and at the worst season of the year, this was accomplished by the indomitable energy of the superintendent, Mr. James G. Fair, in the short space of not quite two months, the new machinery and buildings being superior to those destroyed.

Mr. Fair's report on the operations at the mine during the past year is as follows:

VIRGINIA, NEV., December 31, 1875.

During the past year 169,307⁴⁴⁰/₁₀₀ tons of ore have been abstracted from all the levels of the Consolidated Virginia Mine, and 169,094⁴⁸⁸/₁₀₀ tons have been reduced, which yielded \$16,731,653.43 in bullion. There are now in the ore-house and at the mills 2,988³⁸/₁₀₀ tons, valued by assay at \$478,080.

This ore has been taken from the 1,200, 1,300, 1,400, and 1,500 foot levels, including a small quantity which has been gathered in the explorations which have been made on the 1,550-foot level.

On the 1,200 and 1,300 foot levels the ore-bodies have not been developed as far as they extend north. On the 1,400-foot level the ore has been explored south 450 feet from the shaft, and it extends north from the shaft to the northern boundary of the mine. On this (the 1,400-foot) level the exact width of the ore-body is known.

On the 1,500-foot level the ore has been traced south for a distance of 480 feet from the northern line, and has been thoroughly explored by cross-cuts from the east wall to the west wall. On this level all the ore is of a high grade and the width of the body varies from 150 feet to 320 feet. The ground south of this is entirely unexplored.

On the 1,550-foot level a lateral drift extends the whole length of the mine. Starting at the southern boundary it runs northerly on the east side of the ore until it reaches a point 400 feet distant from the northern line, where it cuts through the clay, and thence passes all the way through ore to the northern line. This level is only partially developed. None of the cross-cuts have yet reached the eastern boundary of the ore. The ore on this level is of a better quality than that which has been found on any of the levels above. Its width, I have no doubt, will prove greater.

At a point 320 feet south of the northern line a double winze has been sunk from this (1,550-foot) level to the depth of 147 feet. This winze has passed all the way through ore of a very high grade, and terminates in ore of the same quality. The sinking of this winze has been temporarily discontinued on account of the increase of water and our limited means for hoisting. From this same level, north of the northern line, another double winze has been sunk to the depth of 128 feet, through excellent ore the entire distance, which terminates in rich ore. The developments made by these winzes prove the continuity, at these lower depths, of the same ore-body which exists on the level above, with an appreciation in the quality of the ore.

From this level, (the 1,550-foot,) at the southern boundary, a double winze has also been sunk down to the 1,700-foot level. From the bottom of this winze a drift has been run north 107 feet. This winze and drift are both east of the ore-vein, and consequently no information in regard to the ore in this locality and at this depth has been gained by the work. Work on this drift was discontinued two months ago on account of the water which flowed into it from the Gould & Curry Mine. This obstacle will soon be removed, and work will be resumed.

All the levels of the mine are connected by various winzes, reaching from level to level for ventilation and the passage of men and materials. The 1,200, 1,300, and 1,550 foot levels are connected with the Gould & Curry shaft for ventilation, and the 1,200, 1,300, 1,400, and 1,500 foot levels are connected with the Ophir Mine for the same purpose.

There is a large reserve of ore in all the levels of the mine which have been opened. In extracting the ore, instead of trying to show an extraordinary yield by the working of the higher grade alone, it has been my constant purpose to so unite the higher and lower grades of ore as to make the average yield conform to an average standard value. And this I have done, believing such a course to be for the best interest of the company.

The complete destruction of our hoisting-works and ore-house by the disastrous fire which occurred on the 26th of October last stopped all work in the mine from that day up to the 13th day of December, on which date we again commenced to hoist ore, and since that time more than 600 tons of ore have been raised daily. This quantity of ore exceeds our present milling capacity, but in fifteen days more this milling capacity per day will be increased 260 tons.

The entire hoisting-works, with ore-house, have been rebuilt on an enlarged scale, with many improved conveniences in the various departments. A two-story building, 100 feet by 50 feet, is in the process of erection, to be used for the assay and bullion department, and it is now about one-half completed. When finished there will be room and facilities for melting and assaying \$5,000,000 of bullion per month.

A large extent of ground around and in the vicinity of the hoisting-works has been purchased to give ample space for the storage of wood, timber, and mine materials.

By the acquisition of this ground the hoisting-works now stand in a comparatively isolated situation, so that there will be but little danger from any fire except that which might originate on our own premises.

For security against all fires, the works are surrounded by hydrants, with a good supply of fire-hose, and there is an ample supply of water under a heavy pressure. I will also add that the city of Virginia is constructing a perfect system of water-works. These works will surround us and give additional protection against fire.

The Virginia and Truckee Railroad encircles us on three sides, so that our mine-supplies are conveniently landed on the west or upper side, and our ore is expeditiously shipped from the east or lower side of the works.

At the C. & C. shaft buildings complete in every respect have been erected, and machinery for pumping and hoisting has been put in place and is now in full operation. In addition to the main building there is a blacksmith-shop, a rope-house, two large carpenter-shops, and one machine-shop. The carpenter-shops are supplied each with an engine and machinery—one of these shops being intended for the use of the Consolidated Virginia Mine and the other for the California Mine. The machine-shop is fitted up with engines, lathes, tools, &c.—one side of which is for the use of the Consolidated Virginia Mine and the other side for the California Mine.

A large area of ground immediately surrounding the site of this shaft has been secured, having been purchased at a heavy outlay. This shaft is situated 1,040 feet east of the Consolidated Virginia shaft. It is now sunk, with three compartments, to the depth of 940 feet. The cost of this joint shaft to this date has been \$436,183.13.

A drift is now being run east from the 1,500-foot level of the Consolidated Virginia Mine, which will connect with the C. & C. shaft. It will reach that shaft and be in readiness for the transportation of ore as soon as the shaft is sunk to that depth. Three hundred and thirty-six feet remain to be sunk to reach this drift.

After this connection with the C. & C. shaft is made, I feel safe in saying that our hoisting capacity will be 2,000 tons per day, and as to the supply of ore, we have now in sight in the mine a sufficient quantity to last for many years.

The secretary of the company reports the following receipts and disbursements:

RECEIPTS.

Bullion	\$16,953,771 39
Bullion-samples	3,767 60
Assay	1,544 44
Insurance	14,696 21
Balance-account, including balances due at last annual meeting from superintendent, treasurer, and banks, all since paid:	
Bank of California	\$82,450 43
J. G. Fair, superintendent	4,655 80
	87,106 23
Less due J. C. Flood, treasurer	03
	87,106 20
	17,060,885 88

DISBURSEMENTS.

James G. Fair, superintendent	\$142,471 29
Cash	639 95
Nevada Bank	40,462 73
Virginia office expenses	6,888 65
Wood, lumber, and timber	285,437 91
Repairs	974 31
Hauling	2,174 18
Freight	5,550 20
Sutro committee	1,998 00
Survey	1,300 00
Books and stationery	937 85
Legal expense	27,505 00
Advertising	288 50
Water	4,500 00
Real estate	15,995 75
Contribution	750 00
Latrobe tunnel	2,942 00
Hoisting	8,392 50
Construction	96,935 53

Taxes.....	\$152,796 13
Bullion reclamation.....	4,344 18
Reduction.....	2,190,236 97
Interest and exchange.....	1,530 50
Bullion freight.....	56,383 79
Dividends Nos. 10 to 21 inclusive.....	12,204,000 00
C. & C. joint shaft.....	201,981 89
Bullion discount.....	640,715 48
Back dividends.....	4 50
Supplies.....	157,519 76
Salaries and wages.....	760,698 87
Expense.....	6,540 46
	17,060,885 88

Best & Belcher.—Mr. Fair, who superintends also this mine and the Gould & Curry, makes the following statements: The Best and Belcher has no works of its own, adjoins the Consolidated Virginia on the south, and has 600 feet of ground. A north drift has been run the whole length of the mine, but no cross-cuts made on account of the great flow of water likely to be encountered, and draining being impossible in the absence of machinery. The outside vein-matter is precisely the same as Consolidated Virginia, and assays from \$5 to \$20 where found. Heavy machinery will shortly be erected.

Gould & Curry.—During the past year the entire shaft has been re-timbered and new and larger pumps put in. A heavy flow of water from the 1,500 and 1,700 foot levels prevented any prospecting during the year.

The following is an abstract of Mr. Fair's annual report to the company for the fiscal year ending November 30, 1875:

The superintendent, in his annual report, says that in the previous annual report he recommended that two additional compartments of the main shaft be sunk from the 1,200-foot to the 1,500-foot level, and that during the year the work was done, doubling the hoisting capacity as well as bettering the ventilation of the mine. Work on the shaft between the 1,500-foot level and the surface had been continuous throughout the twelvemonth. Notwithstanding this work the shaft is now in bad condition and extremely dangerous—the swelling ground crushes in the timbers and is a constant source of delay and expense, and Mr. Fair recommends a stoppage of work for a short time and a substantial re-timbering of the four compartments of the shaft, from the 1,500-foot to the fifth levels. This can be done at the same time work in the mine is carried on, but, in the superintendent's opinion, the cost by this method would be doubled, and the work would not be as substantial as it would be were all other work stopped. The year has shown a material increase in the flow of water in the mine, three-quarters of it coming from the east side of the shaft over 1,500-foot level. All of the 8-inch pumps have been removed within the year, and a 12-inch pump substituted, but even with this increased capacity he was unable to keep the mine free from water below the 1,600-foot level. The moving of the timbers in the shaft displaces pumps and pump-rods, causing stoppages constantly and the accumulation of water, which can only be remedied by a thorough re-timbering of the shaft. On the 1,700-foot level the main drift has been extended to the northern boundary and connected with the Best & Belcher joint winze sunk from the 1,500-foot level, which secured a good ventilation. The east drift on this level has been run east from the incline 1,033 feet to the east wall of the vein, but as it showed strong indications of water, and as the pumps were already working to their full capacity, it was deemed best not to cut into the vein. No cross-cuts have yet been made on this level, and its value, therefore, has not been ascertained. The formations passed through by lateral drifts look favorable and assay from \$5 to \$20 per ton, but all the work done so far is outside the ore-vein. The winze sunk 182 feet below the 1,700-foot level, designed to connect with the 2,000-foot level of the Savage, is now filled with water. The 1,500-foot level has been thoroughly developed by cross-cuts in all parts, but no ore of value has been discovered. Much work has been done on the levels above, in prospecting new levels, and repairing and extending old ones, but all have failed to disclose ore of value. It is evident, says the superintendent in concluding his report, that the company must look to the 1,700-foot level and further depths for the production of ores. Buildings, engines, and machinery are in excellent order, and there are good supplies of timber and materials on hand for the winter.

The following is a synopsis of the secretary's report: Receipts during the fiscal year amounted to \$339,399, of which \$97,648 were from an assessment, \$222,749 from the sale of 12,000 shares of stock, and \$18,466 from various other sources. Disbursements amounted to \$328,377, leaving as cash on hand at the close, \$11,022. Of the disbursements \$280,348 was for labor, \$4,090 for sluice-tunnel, \$3,503 for legal expenses, \$1,174 for exchange, \$22,972 for general expenses, \$3,766 for interest, \$1,752 for taxes, and \$29.84 for minor items.

Savage.—This mine has attained a vertical depth by main incline of 2,300 feet. A winze has been sunk 120 feet below that, making total vertical depth 2,420 feet. No cross-cuts have been made during the year, but drifts north and south on the 2,000 and 2,200-foot levels have been run nearly the entire length of the claim. A heavy body of water was encountered at the bottom of the incline, which arose to the 2,100-foot level and filled all the lower levels. By the middle of January the pumps and tanks had so reduced the water as to allow of work being again prosecuted, when a second body of water broke in the north drift, 2,200-foot level, and flooded the mine up the 1,800-foot level, where it now stands. Heavy pumping-machinery is being constructed; until this is completed, it will be impossible to go on with the work.

I owe these facts to Mr. F. F. Osbiston, the superintendent, to whom I am also indebted for most valuable assistance, and particularly for the collection of reports from other superintendents, and for the compilation of the larger part of the material here submitted concerning the Comstock mines.

Hale & Norcross.—This mine is in the same condition as the *Savage*, they being connected by drifts on each level. The water affects both mines in the same way, which can only be overcome by the application of heavy machinery. James G. Fair is the superintendent.

Chollar.—This mine continues to extract ore from the old workings, the yield for 1875 being 18,850 tons, which milled \$317,382.32, an average of \$16.84 per ton. There are 1,400 feet in the claim; the vertical depth of the shaft is 1,350 feet. On the 1,050, 1,150, 1,250, and 1,350 foot levels drifts have been run to the south line and the necessary cross-cuts made without discovering any bodies of ore. The indications, however, are very flattering, and the company is confident of yet finding paying ore-bodies on getting deeper.

Mr. I. L. Requa, the superintendent of this and the succeeding company, has furnished the facts concerning them.

Chollar, Norcross, and Savage Shaft Companies.—The Chollar, Hale & Norcross, and Savage Companies have commenced to sink a combination shaft situated 3,000 feet east of the Chollar shaft. This is to be used by the three companies, each bearing its share of the expense of sinking, as follows: Chollar contributes $\frac{1}{4}$; Hale & Norcross contributes $\frac{1}{8}$; Savage contributes $\frac{1}{8}$. This will be the largest shaft on the Comstock; there will be four compartments, three of which will be for hoisting purposes and one for pumping entirely. The hoisting compartments will be 5 by 6 feet, the pump compartment 6 by 7 feet. The shaft will be most substantially timbered with 14-inch square timbers, framed in sets, 6 feet from centers. The pumping-machinery, now under contract, will consist of two lines of 12-inch inside diameter pumps connected with one 14 by 14 inch pump-rod. The machinery is to be of sufficient power to sink 5,000 feet. The pumps will be worked by a compound cylinder engine—initial cylinder 34-inch and main cylinder 68-inch diameter, vertical and direct acting. The contract-price is \$260,000. The hoisting-machinery will be of the most improved pattern; in fact, it is to be the hoisting-works of the Comstock.

It is calculated that the shaft will cut the Comstock ledge at about

3,500 feet. The shaft is now being sunk in east country-rock about 4,000 feet east of where the vein shows in the croppings. This shaft will be a great saving to the companies when completed to the vein, as it will do away with the inclines now used, which are both expensive and inconvenient.

Bullion.—Although this mine has never yet produced any paying bodies of ore, Mr. E. A. Schultz, superintendent of the Bullion, Exchequer, and Alpha, writes that he considers the present prospect very flattering. The depth of the shaft is 1,400 feet. Drifting on this level (1,400-foot) a distance of 150 feet south and 275 feet north, and making two cross-cuts, one north and one south, some streaks of ore 2 feet wide were found on the hanging-wall assaying from \$10 to \$120. Pitch of vein 40° east. A drift from the 1,700-foot of Imperial shaft (equal to 1,830-foot level of the Bullion) has been run through the Alpha and Exchequer Companies' ground, and an upraise commenced to connect with the incline at the 1,400-foot level. No explorations have been made on the 1,830-foot level, owing to the insufficiency of air. A drift has been started from the Imperial shaft at the 2,000-foot level, which is the 2,130-foot of the Bullion, by three companies, the Bullion, Alpha, and Exchequer, to prospect their ground. The drift is in west country-rock, not having reached the vein yet. Number of feet in claim, 943 $\frac{7}{10}$.

Exchequer.—This mine has 400 feet in its claim. The company is said to be a very close corporation. The ground is being prospected by the combination drift from the Imperial 2,000-foot level. Prospects favorable. The company has no works of its own.

Alpha.—The same as was said of the Exchequer will apply to this mine. The company claims 300 feet adjoining the Exchequer on the south. No hoisting-works.

Imperial.—This mine, as reported by Mr. C. C. Batterman, the superintendent, has reached a vertical depth of 2,150 feet. No prospecting has been done deeper than the 2,000-foot level. No new bodies of ore have been encountered during the past year. The work of developing the ore already in sight has been vigorously carried on, and some ore extracted and milled which yielded an average of about \$30 per ton. The width of the vein on the 2,000-foot level is unknown, as no cross-cuts have cut entirely through it yet. During the year there were 1,448 feet of drifts run and 248 feet winzes sunk.

Gold Hill proper.—Under this head come the small claims situated between the Imperial and the Yellow Jacket, varying in length from 10 to 120 feet, all of which are prospected through the Imperial and Yellow Jacket shafts. The situation of these claims on lowest levels is the same as Imperial and Yellow Jacket. A consolidation of these claims is spoken of, which will probably soon take place, when hoisting-works will be erected.

Yellow Jacket.—This mine has attained a depth of 1,940 feet, 100 feet of incline being sunk last year. No ore was produced in 1875. There have been run on the 1,740, 1,840, and 1,940 foot levels about 4,000 feet of drift. The vein varies from 250 to 320 feet in width and pitches 40° to the east. Some seams of ore have been encountered on every level, but not sufficient quantities to pay for extracting. The assay-value averages about \$11 per ton. The ledge continues to hold its strength and regularity and is quite free from water. Value of improvements, \$400,000, consisting of hoisting-works and machinery. The entire bullion product of the mine, as reported by Mr. Thomas S. Taylor, the superintendent, to whom I am indebted for the above account, has been \$14,500,000, and dividends \$2,184,000; assessments, \$2,349,000.

Kentuck.—This company has for the last five years done no work from and through its own shaft, which is but 700 feet deep. There are deeper shafts on each side of its ground, which contains but 96 feet, and has been thoroughly prospected from both the Crown Point and Yellow Jacket shafts. The vein is very strong, and carries a very large proportion of quartz, which, however, assays but little. No ore has been extracted for the past five years. Mr. S. L. Jones, the superintendent, has charge of the Crown Point also, and has favored me with the accounts here published of both mines.

Crown Point.—This mine contains 600 feet of the length of the lode, and has attained a vertical depth of 1,700 feet. There have been 8,000 feet of drifts and winzes run during 1875 on the 1,500, 1,600, and 1,700 foot levels. The width of the ledge varies from 75 to 150 feet and pitches very regularly 36° east. On the 1,500-foot level the ore is of low grade, containing about \$30 in gold and silver to the ton. On the 1,600-foot the quartz is the same as on the 1,500, but contains less metal until it reaches a point 100 feet north of the Belcher line, where a decided improvement takes place, and the ore-body apparently assumes its former size and value. On the 1,700-foot one drift has been run, which is to the east of the incline, and exposes 140 feet of quartz, assaying from \$4 to \$10, with a base-metal streak of about 4 feet inside nearly in the center. Owing to the great heat, which is 120° Fahrenheit, this drift has been stopped for the present without having reached to east wall. The total amount extracted in 1875 is 155,180 tons, which yielded \$3,124,052. The total amount of bullion produced since 1865 is \$23,449,387.68. Dividends paid during the same, \$11,898. Assessments for the same period, \$662,100. Improvements valued at \$400,000.

Belcher.—This mine contains 1,040 feet on the lode; vertical depth, 1,650 feet. The width of the ledge varies from 200 to 300 feet, and pitches 37° east. Number of tons of ore extracted in 1875 was 126,350; value of ore extracted during same time, \$3,107,993. Total value of ore extracted since 1865, \$31,411,938.31; amount of dividends paid during same time, \$15,393,600; amount of assessments, \$660,400. The width of ore on the 1,600-foot level is about 60 feet, and will yield about \$30 per ton. On account of water and the absence of pumps in this mine, but little has been done below the 1,500-foot level, and nothing is known of the value and extent of the ore-body. New pumping-machinery is now being put in place, at a cost of \$400,000; expense to be divided between the Crown Point and Belcher Companies. This will enable them to prospect to a depth of 4,000 feet. The pumps will be placed in the air-shaft, which has been retimbered since the fire, and will now be used for pumping as well as ventilation. Mr. W. H. Smith, the superintendent, furnishes the facts as to this mine, and also the Segregated Belcher.

The following is an abstract of the secretary's report for the fiscal year of the company:

The receipts were: From bullion, \$3,383,873.55; cash on hand, January 1, 1875, \$22,079.15. The principal items of disbursements were: From dividend No. 34, \$312,000; the aggregate expenses were \$2,846,717.65; cash on hand, \$329,759.45, and a time certificate in the Bank of California of \$148,952.61. There were 34,117 tons of ore worked during the year, which yielded at the rate of \$28.43 per ton.

To this may be added the following:

The drift running south from the incline, 1,500-foot level, is in a distance of 416 feet. The east drift, same level, on the sill-floor, has attained a length of 92 feet. The northeast drift, on the 1,600-foot level, is in 332 feet. The stopes continue to yield well, especially the 1,500-foot level, the ore from which runs very high in gold.

Segregated Belcher.—This mine has 160 feet of ground, and has been prospected of late years through the Belcher and Overman shafts.

Some streaks of very rich ore found on the 1,300-foot level, which is their lowest working level, but not in paying quantities. Mr. W. H. Smith is the superintendent.

Overman.—This mine contains 1,200 feet of ground. The shaft, which is in east country-rock, has attained a vertical depth of 1,168 feet. The mine has been prospected throughout the north 600 feet, on the 700, 900, and 1,100 foot levels. Four hundred feet north of the shaft there has been sunk a winze, which has followed a very regular wall on the west side from the 700 to the 1,100 foot levels. In this winze, and lying on the foot-wall, some very rich seams of ore, varying from 2 inches to 6 feet, have been discovered, of which about 400 tons have been extracted, the value of which is about \$20,000. The ore is remarkably free from all base metals. During the past year very little prospecting has been done on the 1,100-foot level, owing to an immense flow of water at the bottom of the shaft. New and powerful pumps, the largest now in use on the lode, are successfully handling the water, and the sinking of the shaft is being carried on. The pumps, which are 14 inches diameter and 8 feet stroke, run at the rate of 6 strokes a minute. The sinking is necessarily slow, and but 5 feet per week are added to the depth of the shaft. There have been 2,500 feet of drifts run on the various levels, none of which, excepting the north drift on the 900-foot level, have developed any ores of value. Mr. Charles Forman, the superintendent of this mine, has charge of the Caledonia also, and has furnished the accounts of both.

Caledonia.—During the past year a new shaft, 1,040 feet east of the old shaft, has attained a vertical depth of 945 feet. No drifting has been done from this shaft, except to cut the vein at a depth of 1,600 feet. Value of improvements on the mine, \$240,000. The old shaft is shut down, owing to the ground through which it passed being clay and very heavy on the timbers, which made it troublesome and expensive to keep in repair. Considerable low-grade ore has been extracted from this mine in former years, but not of sufficient value to pay over expenses.

Justice.—This mine, which has heretofore been considered an outside claim, has the past year developed considerable ore, of which assays as high as \$7,000 have been procured. The average value, however, of the ore developed so far, being 120 feet long and 15 feet wide, is about \$35 per ton. The rock is of a gypsum character. There have been 1,100 tons extracted during the past year, which milled \$26 per ton. The ore is found on the 600-foot level, the course of which is north 22° west. The lowest level is the 860-foot; no prospecting has been done at this point. The future of the mine is very encouraging, there being a large quantity of milling-ore in sight. Cost of improvements, \$120,000. During the year 1875, 1,500 feet of drifts were run on various levels. Mr. T. J. McClelland, the superintendent, is authority for these statements.

Silver Hill.—This property is a consolidation of the Echo, Saint Louis, and Lucerne claims, and adjoins Justice on the south. The claim embraces 4,075 feet. Two distinct ledges run through this ground, each cropping out prominently at the surface, and can be traced nearly the entire length of the claim. The mine has yielded over \$1,000,000 in bullion, principally gold; but as depth is obtained the silver is increasing and gold decreasing. The vein on the 334-foot level is about 120 feet wide and has well-defined walls on either side; the pitch is 45° east. Thousands of tons of ore have been extracted from the first, second, and third levels. The south portion of the mine has been prospected but little. Vertical depth of shaft is 444 feet. An incline was begun here, and is now down 111 feet. The character of the ore is much the same

as that of the Justice. For the above description I have to thank Mr. John Van de Water, the superintendent.

Succor.—This company, which has for several years produced considerable bullion, has for the last two years been engaged in sinking a new shaft some 2,000 feet to the east of the old workings. The shaft is now 630 feet deep, and some fine ore, assaying as high as \$275, has been struck in the bottom of the shaft. As this development has been made but a few days, it is impossible to state its value. Mr. John Segur, who furnishes the above description, is the superintendent.

Dayton.—As I learn from Mr. N. C. Hall, the superintendent, this mine, situated on the line of the Comstock, has been a producing one for several years, having yielded \$340,000; but the ore of the surface-workings to a depth of 300 feet has almost given out, and the company are now sinking their shaft deeper in hopes of the ore coming in again, as the ledge is remarkably well defined and its walls very regular. Depth of shaft, 650 feet; lowest drift, 500 feet.

Kossuth.—This mine has 2,700 feet of ground, and joins the Dayton on the south. The shaft is 600 feet deep. Pitch of vein, 40° east; width of vein, 80 feet. Assay-value of ore, \$12. The mine has produced about \$50,000 in bullion. Value of improvements, \$150,000. Ledge well defined and holds its strength throughout its entire depth. At a distance of 1,400 feet north and south considerable water coming from the 350 and 500 foot levels. The south end of the mine has of late shown considerable improvement on both the 350 and 500 foot levels, the ore occasionally assaying as high as \$170. Mr. P. H. Scott, the superintendent, who furnished the above statement, considers the prospects of this mine very encouraging.

Webber contains 1,500 feet, and joins the Kossuth on the south. This being a new location, little can be said. The shaft is down 125 feet. Kossuth's prospects are encouraging for this mine. Mr. J. P. Hutchinson is the superintendent.

Daney.—This mine is next to the Webber on the south, has erected fine machinery, and is now 500 feet deep. Drifting on 400-foot level has developed a large and well-defined vein, but no ore of value has been extracted. The claim has 2,000 feet of ground. The mine has been shut down for several months, but will resume operations about the 1st of March next. Mr. T. J. McClelland is the superintendent.

Quinn.—This, the next mine of importance south, is considered a very promising one. Considerable money has been expended in developing the ledge already found and known to be of value. The croppings are very prominent, and assays as high as \$1,000 are obtained from them. The company has strong hope of discovering a bonanza in the claim, and, as the prospects warrant it, no expense will be spared in its early development. The quartz found is very similar to that in the Belcher and Crown Point, being strong and healthy and very free from base metals. Contains about two-thirds silver to one-third gold, and is the only mine on the Comstock that shows bromide of silver. This mine is unlike other mines in the Spring Valley district, as most of them, commencing at the Dayton, north, show but little silver. Mr. F. F. Osbison is superintendent.

Knickerbocker.—This mine is situated on the southwest branch of the Comstock lode and adjoins the Caledonia on the south. Prospecting is being carried on to a depth of 700 feet, but Mr. H. V. S. McCullough, the superintendent, reports that no ore of value has been found.

Baltimore.—This mine joins the Knickerbocker on the south, and has 1,050 feet of ground. The shaft has attained a depth of 1,100 feet.

Prospecting from the shaft has been carried on from four levels; some ore assaying very high was found on the 300-foot level, the average value of which was \$100 per ton. Seventy-five tons were obtained from this level and are now in the company's dump. The vein is quite narrow, but increases in width with depth and pitches 36° east. I have to thank Mr. E. Strother, the superintendent, for the above description.

Rock Island.—This mine is situated next to the Baltimore on the south, and is in about the same condition. The vein is wider, being 218 feet in the south end of the mine. The shaft is down 869 feet; the last 166 feet of the shaft is in the vein. Average assays of quartz, \$18, although very fine bunches of rich ore are occasionally found on the 450-foot level. There is considerable water in the vein. Value of improvements, \$75,000, consisting of hoisting-works, machinery, &c. Mr. Charles Forman, the superintendent, furnishes the above account.

Florida.—This is the last mine of note on this branch of the Comstock. The shaft is about 700 feet deep; the vein on the 110-foot level is 185 feet wide, and assays very low. Some fine pieces of ore have been found on the 300-foot level, but as a general thing the ore is very base, as I am informed by Mr. J. E. De Noon, the superintendent.

Julia.—This mine is situated east of the Chollar, and in a cañon which runs parallel with the one in which the Yellow Jacket, Belcher, and Overman are situated, but some hundreds of feet to the east. The mine has attained a vertical depth of 1,680 feet; prospecting has been done on several levels without finding ore of value. Their lowest level is the 1,500-foot. Some fine streaks of ore are met with, and judging from the character of the vein, which is one and the same as that of the Chollar, the prospects for a mine are good.

Europa.—This mine is next south to the Julia, and has 1,000 feet in claim. The depth of the shaft is 450 feet. Have drifted on the 310-foot level 450 feet west. Width of vein 85 feet; pitch, 48° east. Assays of quartz from \$4 to \$25. Ledge strong and well defined; walls perfect and very regular. Mr. John Lambert, the superintendent who furnishes the above facts, reports the influx of water as about 6,000 gallons per 24 hours.

Sullivan.—This is the next claim upon which work is being done. It is on the same vein as the Julia, Europa, and Woodville. A shaft is being sunk to prospect the ground.

Alta.—This claim joins the Sullivan on the south; the shaft is down 355 feet; no drifting done yet; expect to cut vein at 600 feet. This mine has erected very heavy and expensive pumping-machinery, and has started in good earnest to develop its ground. Mr. C. C. Derby is the superintendent.

Lady Washington.—This joins the Alta on the east. The company is engaged in sinking its shaft, which has attained a depth of 550 feet. Width of ledge over 100 feet; pitches 47° east. Will intersect vein at 650 feet. Vein same as Justice. Very heavy machinery on the claim. Mr. R. P. Keating is the superintendent.

Woodville.—This claim lies where the two cañons intersect, and it is here that the trouble occurs as to the title between the Justice and this company. Some authorities express the opinion that the vein here belongs to the Woodville; but the point is a difficult one. The company has extracted a great deal of ore, but most of it is of low grade. Mr. Baldwin is superintendent.

The Sutro tunnel.—The opinion expressed in former reports concerning the importance of this enterprise to deep mining on the Comstock lode is likely to become universal before long. In spite of the positive

predictions of many of the superintendents and mining captains, large amounts of water are continually encountered at considerable depth; and it may almost be said that there is no time when some mine on the vein is not in trouble from this cause. Concerning the merits of the legal controversy between the Sutro Tunnel Company and the managers of the mines, I have no opinion to express, except that it is most unfortunate that a work which should have been completed long ago by the joint efforts of all the companies is hindered, delayed, and rendered extremely expensive by quarrels, intrigues, and law-suits.

The following account of the tunnel and its progress to February, 1876, has been prepared, at my request, by Mr. H. S. Drinker, of Philadelphia. It will be found valuable for reference and comparison:

The Sutro tunnel commences at the town of Sutro, which is located in the Carson Valley, $3\frac{1}{2}$ miles from Dayton and $1\frac{1}{2}$ miles from the Carson River. Its general course is west-northwest, with a rise of 3 inches in 100 feet. It will reach the lode at a distance of 19,899 feet from the mouth and 1,970 feet below the croppings on the Savage claim, (1,922 feet below the shaft-mouth of that mine.) Drifts will be driven along the lode from this point both north and south. The act passed by the Forty-second Congress requires that the main tunnel shall, throughout its entire length, have a cross-sectional area of at least 140 square feet, including timbers and space for drainage, and shall on or before its completion be provided with necessary timber-supports, double railroad-tracks, and working-shafts. Work was commenced on this important enterprise on the 19th of October, 1869, at which time but 15 men were employed, and they only on day-shifts. Operations were conducted on this limited scale up to December 1, 1871, at which date the header, the only point where work was prosecuted, had been driven a distance of 2,601 feet. Under the impetus given by the consummation of successful financial negotiations, the force was increased during the month of December, 1871, to 232 men; four shafts were located nearly equidistant from each other along the line of the tunnel, and hoisting engines and pumps purchased for each.

The pumps used are the double-acting cataract steam-pumps, manufactured by Messrs. Allison & Bannan, of Pottsville, Pa. They have steam-cylinders 20 inches by 72 inches and 10-inch discharge-pipes, weighing 20,000 pounds each, and capable of lifting the water from station to station, 300 feet apart. Steam-pumps of this capacity had not been introduced before on the Pacific coast, though they have been in use quite extensively for some years in the coal-regions of Pennsylvania. They prove greatly preferable to the old style of Cornish pump, now in general use, as to simplicity, cheapness, durability, and diminished liability to get out of order. To illustrate the working of these pumps, the following extracts are taken from the report of the superintendent of machinery for the year 1872:

Shaft No. 1—April.—"In this month the water caused considerable trouble here, there being over 3,000,000 gallons pumped from the shaft during the month. Much damage was done to the pump by the sand and gravel cutting out the packing and wearing away the cylinder and glands. The brass lining of the pump-cylinder had to be taken out and a new piston made. During these repairs the pump had to be raised by means of a chain-tackle twice (10 feet each time) in order to keep it out of the water, so that the machinists could continue their work, and in the 24 hours that it took for these repairs the water rose 36 feet in the shaft. At the same time the hoisting-engine was raising water as rapidly as possible, in a tub constructed for that purpose."

Shaft No. 2—November.—"The chief work done here during the month was fitting up the two large pumps. One of them is in a station 275 feet and the other 550 feet from the surface. Each of these pumps weighs 10 tons, and the bed-plates they rest on are 30 feet long. The pumps are double-acting, constructed with two plungers and two sets of valves, or, otherwise, two single-acting pumps connected to one steam-piston. The column through which the water from these pumps passes to the top of the shaft is of wrought iron with cast-iron flanges, and is 10 inches in diameter. This column is securely braced and supported by the shaft-timbering. The shafts at all places are 10 feet long in the clear by 5 feet wide, and the timbering is 10 inches by 12 inches, in sets 5 feet apart, supported by corner-posts 10 inches by 10 inches. A girt of 10-inch by 12-inch timber divides the hoisting-shaft from the pump-shaft, making the hoisting-shaft 4 feet 2 inches by 5 feet in the clear, and the pump-shaft 5 feet by 5 feet in the clear; boards are nailed on the girts so as to make each shaft independent, and a ventilator-box is carried up through the roof of the building over the pump-shaft. The water-column from the second pump discharges its water into a tank at the first pump-station; from thence it is pumped by means of the pump at that place and discharged into tanks at the surface. * * * The steam-pipe is of wrought iron, and is 6 inches in diameter down to the first pump, 5 inches in diameter to the second pump, and diminished in size proportionately as more pumps are put in. The steam is conducted along the pump-station from the main pipe to the pump by a 3-inch wrought-iron pipe at each pump. The suction-pipe, from the pump to the tank, is 10 inches in diameter, and is chiefly cast iron. The water is made to pass through a condenser before coming to the pump. This condenser is placed at the back end of the pump-station, and can be used at pleasure by opening a valve, which will turn the exhaust-steam through the condenser instead of conducting it to the exhaust-box. The exhaust-box is of wood, 12 inches by 12 inches internal area, and the exhaust-steam from all the pumps is turned into it, and by it carried to the top of the shaft. The water which may overflow from the pump-stations is also conducted into this box, so as to prevent it splashing in the shaft. All the steam and exhaust pipes are covered with thick cow-hair felt sewn upon canvass and painted; and notwithstanding this precaution the heat in these stations is frequently over 100°.

"The condensers are the ones patented by Henry L. Brevoort, of New York. They are made of cast iron, 3 feet in diameter and 6 feet long. The water is taken in from the side, and passes up to the top through an annular space, thence through an annular adjustable valve, where it is formed into a sheet-jet, through which the exhaust steam is made to pass. The amount of pressure to the jet is regulated by a float, and the water can also be regulated by hand.

"The number of hoists made here this month has been 4,297. The two 48-inch boilers were used, and an average steam-pressure of 60 pounds was maintained. The fuel consumed was 99 cords of Carson pine. The quantity of water pumped from the shaft was 68,900 gallons in 24 hours."

The tunnel has now (1876) passed shafts Nos. 1 and 2, which are used for ventilation. The draught ascends very strongly up shaft No. 2, entering at the mouth of the tunnel. Shafts Nos. 3 and 4, the former after reaching a depth of 456 feet, and the latter after being sunk 674 feet, were abandoned, on account of the immense influx of water, which it was impossible to master.

The header had reached, on the 15th day of February, 1876, a length of 12,259 feet, leaving 7,640 feet to be cut. The tunnel for the last 800 feet has been in mineral, assaying from \$2 to \$20 per ton. It can only be ascertained by actual experiment whether this country-rock will pay for concentration and reduction; if it does, there is enough material already traversed to last for the next hundred years.

At present, natural ventilation takes place as far as shaft No. 2, beyond which mechanical means are necessary until a connection is established with the mines. Two No. 4 Root blowers are used, with 11-inch galvanized-iron tubing, and the air in the header, 3,300 feet beyond shaft No. 2, is perfectly pure and cool. But besides the air delivered by the blowers, there is the condensed air, which is delivered by the use of six machine-drills in operation in the header. The Burleigh drills in use in the header were at first supplied with air by a compressor located at shaft No. 1, which had been constructed by the Société Cockerill, of Belgium. After shaft No. 2 was passed, the air-compressor at shaft No. 1 was exchanged for a new one started at shaft No. 2, constructed by the Humboldt Company, of Kalk, near Dentz, on the Rhine. Both compressors have given great satisfaction.

In bad ground, or wherever timbering is thought necessary, 12-inch by 14-inch posts, with 14-inch by 16-inch caps, are used, placed 5 feet apart, though in some places they are put close to each other. The timber used is sawed pine; and in bad ground the center-piece of a tree is always selected. Timber costs on an average \$30 per thousand, delivered at the mouth of the tunnel. Wood is used for fuel, and costs \$6.50 per cord, delivered.

In 1874, when machine-drills were first used at the tunnel, the Burleigh drill was adopted, and has thus far done very satisfactory work. From information received at Mont Cenis, Hoosac, and elsewhere, it was supposed that five drills were needed for every one in operation, but practical experience here has shown that for the six drills in use, four or six at most additional ones would keep the heading going without any interruption—that is, provided there is a machine-shop and competent mechanics are employed to keep the machines in repair. English steel was at first employed, but at present Black Diamond steel, made in Pittsburgh, is in use and is considered fully equal to the English.

The heading which is now being driven, 8 by 10 feet, is blasted out by means of a center-cut and "squaring up." This will ultimately be enlarged to a section of 10 by 12 feet. The cut has a depth of from 7 to 8 feet, and a face of from 4 to 5 feet. From 3 to 8 holes are drilled on each side. This wedge being first blasted out, the sides are then squared up by means of one or two series of 4 or more holes each, according to the hardness of the rock. The average time to take out a cut and square up averages about 12 hours.

Before machine-drilling was introduced, the average progress was not over 100 feet per month, while now it is at least 350 feet for every thirty days. Where timbered, the tunnel as far as completed is 12 by 16 feet outside of the timber, which are 10 by 12 inches, except the inside posts, which are 10 inches square. This is divided into two compartments, each $5\frac{1}{2}$ feet wide at the bottom, $4\frac{1}{2}$ at the top, and 10 feet high, with a passage-way between and a drain underneath. The top and sides are covered with lagging of 2-inch plank. The shafts are timbered with sets of 10 by 12 inch timber, placed 5 feet apart from center to center, with 10 by 10 inch posts.

The following table gives the location and depth of the four principal shafts of the tunnel:

	Distance from mouth of tunnel.	Depth of tun- nel-level.
	<i>Feet.</i>	<i>Feet.</i>
Shaft No. 1, (finished).....	4, 915	523
Shaft No. 2, (finished).....	9, 065	1, 041
Shaft No. 3, (abandoned).....	13, 545	1, 361
Shaft No. 4, (abandoned).....	17, 695	1, 465

All work on the tunnel has been done by day-labor, with the exception of some very small contracts in the first stages of the work.

The rates of wages are as follows, (in gold:)

Foremen, per day.....	\$8 00
Shift-bosses, per day	6 00
Drill-men, per day	5 00
Laborers, car-men, and all others employed under ground.....	4 00

In addition to the above rates the following premium has been offered during the past year: For every foot over 300 per month, and less than 400, \$5 per foot; of 400 and less than 500, \$10 per foot; anything over 500, \$20 per foot. The above to be divided equally among the men employed under ground.

In the heading two men are employed to each machine, one drill-man and one miner assisting, making a total of thirty-six per day. These men do all the work of shoveling and loading in the heading, in addition to the drilling. The average number of men employed by the company during the year 1875 was as follows: 1 general superintendent, 1 accountant and paymaster, 1 chief engineer, 1 assistant engineer, 1 carpenter, 1 foreman of tunnel, 3 shift-bosses, 3 blasters, 18 drill-men, 1 drill-boy, 18 miners, 11 car-men, 1 station-tender, 3 track-layers, 4 timber-men, 10 repair-men, 3 machinists, 1 machinists' helper, 3 engineers, 2 firemen, 2 blacksmiths, 2 blacksmiths' helpers, 1 tinsmith, 3 watchmen, 4 teamsters and assistants, 1 hostler, 7 laborers, 1 ranchman, 1 laborer on improvements, 1 mail-carrier; total, 110.

Work on the tunnel is now (1876) being vigorously pushed, and it is expected that it will be completed about January 1, 1878.

The following tables will show the monthly progress made in driving the heading and in sinking shafts, from the beginning of the work up to March 1, 1876. A set of averages is also appended, showing details of work during the year 1875:

Statement of progress of the Sutro tunnel from October 19, 1869, to March 1, 1876.

Month.	Header.			Character of rock.	Remarks.
	Prog. ress.	Total.	Size.		
1869.	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>		
November	254		14 by 16	Conglomerate boulders and cement.	From October 19 to December 3, 1869.
December	206		14 by 16	do	From December 3 to December 31, 1869.
Total for 1869		460			
Distance January 1, 1870.		460			
1870.					
January	201		14 by 16	Conglomerate	
February	136		14 by 16	do	
March	95		14 by 16	Breccia and tufa	
April	110		14 by 16	do	
May	135		8 by 8	do	
June	157		8 by 8	do	Struck 6 miners' inches of water.
July	116		8 by 8	Red clay	
August	82		8 by 8	Blue clay	Timbering.
September	126		8 by 8	Vein-matter	
October	19		8 by 8	do	
November	48		8 by 8	do	
December	65		8 by 8	do	
Total for 1870		1,290			Monthly average, 1870, 107½ feet.
Distance January 1, 1871.		1,739			
1871.					
January	53		8 by 8	Propylite and vein matter	
February	39		8 by 8	do	
March	53		8 by 8	do	Struck 20 miners' inches of water March 1.
April	35		8 by 8	do	
May	116		8 by 8	do	Timbering.
June	135		8 by 8	do	
July	99		8 by 8	do	
August	98		8 by 8	do	
September	80		8 by 8	do	
October	53		8 by 8	do	
November	61		8 by 8	do	
December	93		8 by 8	do	
Total for 1871		915			Monthly average, 76½ feet.
Distance January 1, 1872.		2,665			
1872.					
January	47		8 by 8	Propylite	
February	72		8 by 8	do	
March	29		8 by 8	do	
April	45		8 by 8	do	
May	45		8 by 8	do	
June	40		8 by 8	do	
July	40		8 by 8	do	
August	117		8 by 8	Trachyte	
September	105		8 by 8	do	
October	91		8 by 8	do	
November	91		8 by 8	do	
December	93		8 by 8	do	
Total for 1872		815			Monthly average, 67.91 feet.
Distance January 1, 1873.		3,480			
1873.					
January	90		8 by 8	do	
February	81		8 by 8	do	
March	121		8 by 8	do	
April	116		8 by 8	do	
May	114		8 by 8	do	
June	85		8 by 8	do	
July	109		8 by 8	do	
August	118		8 by 8	do	
September	123		8 by 8	do	Drifts east and west from No. 1 begun August 14. Header to October 27, connected with No. 1.

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Statement of progress of the Sutro tunnel, &c.—Continued.

Month.	Header.			Character of rock.	Remarks.
	Prog- ress.	Total.	Size.		
1873.	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>		
October	105		8 by 8	Trachyte	
November	73		8 by 8	do	
December	129		8 by 8	do	
Total for 1873.		1,284			Monthly average, 105.33 feet.
November		685			Drifts from bottom of No. 1.
Distance January 1, 1874.		5,399			
1874.					
January	134		8 by 8	do	
February	98		8 by 8	do	
March	99		8 by 8	do	Two machine-drills started.
April	136		6 by 14	do	
May	154		8 by 14	do	East and west drifts from shaft No. 2 begun May 10.
June	194		8 by 14	do	Four machine-drills started June 22.
July	208		8 by 14	do	
August	300		8 by 14	do	
September	310		8 by 14	do	
October	360		8 by 14	do	
November	270		8 by 10	do	
December	417		8 by 10	do	
Total for 1874.		2,680			Monthly average, 223.33 feet.
Distance January 1, 1875.		8,079			
1875.					
January	350		8 by 10	Conglomerate trachyte....	
February	289		8 by 10	Trachyte	
March	314		8 by 10	do	March 24, connected with drifts from shaft No. 2.
April	239		8 by 10	do	Blasting down and levelling from No. 2.
May	209		8 by 10	Conglomerate and greenstone.	
June	358		8 by 10	do	
July	358		8 by 10	Andesite porphyry	Rock contains iron pyrites.
August	370		8 by 10	Clay-quartz porphyry	Cut two quartz ledges, 65 feet and 112 feet wide.
September	326		8 by 10	do	
October	285		8 by 10	Clay-slate porphyry	
November	335		8 by 10	Andesite porphyry	
December	195		8 by 10	Greenstone porphyry	
Total for 1875.		3,723			Monthly average, 310.66 feet.
Distance January 1, 1876.		11,607			
1876.					
January	300		8 by 10	Andesite greenstone	
February	308		8 by 10	Clay-porphry	
		608			
Total March 1.		12,415			

Month.	Shaft feet No. 1.			Shaft feet No. 2.			Shaft No. 3 sunk.	Shaft No. 4 sunk.	Remarks.
	Sunk.	Drift east.	Drift west.	Sunk.	Drift east.	Drift west.			
1872.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	
January.....									Work on shaft begun in January.
February.....	105			123			110	110	
March.....	27			63			46	40	
April.....	44			123			63	65	
May.....	24			97			34	30	Air-shaft also begun May 27.
June.....	63								
July.....	65			79			37	45	
August.....	32			55			47	66	Air-shaft completed July 12, 210 feet.
September.....	57			63			29	33	
October.....	19						11	1	
November.....									
December.....	21			41				46	
Total.....	457			641			377	436	
1873.									
Total January 1.....	457			641			377	436	
January.....	7			41			12	31	
February.....	40			36			16		
March.....	15			16				17	
April.....									
May.....									
June.....									Shaft No. 1 reached tunnel-level June 5.
July.....	3								
August.....		71	54						Drifts east and west from No. 1 begun August 14.
September.....		180	163					26	
October.....		93	94	22			14	37	
November.....				24			37	47	No. 3 shut down November 4.
December.....				34				57	
Total.....	523	344	311	814			456	651	
1874.									
Total January 1.....	523	344	311	814			456	651	
January.....				324				23	January 9 passed quartz-lodge in shaft No. 4, 3½ feet wide. No. 4 shut down January 12.
February.....				50					
March.....				122					
April.....				41					
May.....					83	77			
June.....					89	93			
July.....									July 1 driven from drifts from No. 2 by influx of water west drift.
August.....									
September.....									
October.....									
November.....									
December.....									
Grand total.....	523	344	311	1,054	171	170		674	

Table of averages for 1875.

Progress per week, feet.....	71.69
Flow of water, miner's inches.....	51.11
Air temperature at mouth, deg. Fahr.....	59.9
At shaft No. 1 east, deg. Fahr.....	74.35
At shaft No. 1 west, deg. Fahr.....	67.65
At shaft No. 2 east, deg. Fahr.....	79.17
At shaft No. 2 west, deg. Fahr.....	80.67
At heading, deg. Fahr.....	82.58

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Water temperature at mouth, deg. Fahr.....	74. 89
At shaft No. 1, deg. Fahr.....	76. 86
At shaft No. 2, deg. Fahr.....	79. 39
At heading, deg. Fahr.....	81. 81
Number of holes drilled.....	308. 81
Number of holes blasted.....	344. 62
Aggregate depth, feet.....	2, 092. 21
Average depth, feet.....	6. 77
Powder consumed, pounds.....	2. 62
Number of exploders consumed.....	351. 28
Rock extracted, car-loads.....	521. 81
Number of drills sharpened.....	448. 8
Number of men employed.....	110

Feet.

The progress of the tunnel-header (10 feet in width and 8 feet in height) for the year 1875 has been.....	3, 728
Giving an average progress per month of.....	310. 66
An average progress per week of.....	71. 69
An average progress per day of.....	10. 24
And an average progress per shift of eight hours of.....	3. 41

Quantity of water.

The average daily flow of water (in miner's inches, allowing 6 inches pressure above the top of the orifice) has been.....	51. 11
--	--------

Gallons.

Which is equal (in standard gallons at 12.2 gallons for each miner's inch per minute) to a flow per minute of.....	623. 54
Per hour.....	37, 412. 40
Per day.....	897, 897. 60
Per month.....	26, 936, 928. 00
And for the whole year.....	323, 243, 186. 00

Tons.

Calculating the weight of each standard gallon at 8.33 pounds, we get an average flow per minute (in tons of 2,000 pounds) of.....	2. 1194
Per hour.....	155. 1644
Per day.....	3, 739. 1456
Per month.....	112, 191. 1680
And for the whole year, of.....	1, 346, 302. 160

Air temperature.

Deg. Fahr.

During the year the average temperature at the mouth of the tunnel was.....	61. 23
The highest temperature was on July 22.....	86. 00
The lowest on January 22.....	33. 00
At a point immediately east of shaft No. 1 the average temperature was.....	74. 35
The highest, (October 8).....	79. 00
The lowest, (August 1).....	62. 00
At a point immediately west of shaft No. 1 (there being a slight air-current down shaft No. 1 and up shaft No. 2) the average temperature was.....	67. 65
The highest, (September 15).....	76. 00
The lowest, (April 15).....	56. 00

	Deg. Fahr.
At a point immediately east of shaft No. 2 the average was....	79.17
The highest, (October 15).....	82.00
The lowest.....	78.00
At a point immediately west of shaft No. 2 the average was....	80.67
The highest, (October 15 and December 15).....	83.00
The lowest.....	79.00
At the heading the average temperature for the year was.....	82.58
The highest, (December 1).....	88.00
The lowest.....	79.00

It is a curious fact that the temperature in the tunnel, especially near shaft No. 1, is lower in the hottest part of the summer than during the winter months.

Water temperature.

The average temperature of the water flowing from the tunnel was:

	Degrees.
At the mouth.....	74.89
At shaft No. 1.....	76.86
At shaft No. 2.....	79.39
At the heading.....	81.81

Holes drilled and blasted.

During the last eight months of the year (no account having been kept before that time) there were drilled, by means of six Burleigh drills, a total of 9,882 holes from 2 to 2½ inches in diameter. In many cases, but more especially in hard rock and when in proximity to timbers, holes had to be blasted twice, swelling the total of holes blasted to 11,029. The aggregate depth of all the holes drilled is equal to 66,951 feet, or a line 12.68 miles in length. The average depth of holes was 6.77.

Powder consumed.

To blast the holes above mentioned 25,945 pounds of Giant and Hercules powder was used, the average for each hole being 2.62 pounds.

Exploders consumed.

A total of 11,241 exploders were set off by friction batteries.

Rock extracted.

The number of car-loads of rock removed during the last eight months was 16,698, which, at an average of two tons each, gives a total of 33,398 tons.

Drills sharpened.

The account of the number of drills sharpened was only kept for a portion of the year; at times as many as 110 drills were required for one round of holes, while at others very few were required.

LANDER COUNTY.

The principal mining operations of this county are in the Reese River district, where the Manhattan Company controls nearly all the producing mines. By a steady policy of acquiring contiguous mining-claims, this

company has greatly strengthened its position, and avoided conflicts of title which would have been disastrous to the district. I know of no place in the United States where such conflicts could more easily arise, or would be more difficult to decide, than at Lander Hill. The veins are small, numerous, and full of faults and dislocations. More than once, in the earlier days, a rich vein was suddenly cut off by a cross-fissure, beyond which the continuation could not be found. To trace the movement and rediscover the vein was difficult enough, but to prove its identity and so establish ownership against the claim of some adjoining owner was well-nigh impossible. The natural result was, that the miner who had lost his vein pushed boldly into the country-rock to find it, and "recognized" as the missing property the first vein he found which was rich enough to convince him of its identity. The lapse or purchase of one title after another has now made the Manhattan Company the owner of so much ground, that exploration and extraction can be carried on freely. This is not only a good thing for the company: it is the only condition which permits the exploration of the district. These small and broken, though often rich veins, could not support the expense of separate administrations, in addition to the necessary high cost of mining in such ground and of the reduction of refractory ores in a district scantily supplied with fuel and remote from railway communication. The Manhattan Mill, owning the only Stetefeldt furnace in the region, (the company having purchased the exclusive right,) enjoys a considerable custom business, besides its regular work on the ore of the company's mines. The company reports a product of about \$600,000 for the year, but the reported product of the county, most of which came, I presume, from the Manhattan Mill, was over \$1,000,000. The Battle Mountain Mining Company, (near Galena,) producing during the year \$69,700, was the only other considerable enterprise in progress and yielding returns. For the products of smaller concerns, the assessor's report may be consulted, on a previous page.

I regret that the miscarriage of a paper by Mr. Alexander Trippel prevents me from presenting in this place some further notes of technical interest on the experiments in ore-concentration and in processes of reduction carried on during 1875 in Central Nevada. If these should be in whole or in part recovered before the final pages of this report are printed, they will be given in the Appendix.

NYE COUNTY.

This county, which for a number of years back has been comparatively dormant, has during the last year begun again to furnish considerable amounts of bullion. The principal product of this year, however, did not come from the old districts, most of them having, in spite of considerable developments, remained unprofitable. The Tybo district, though comparatively new, has proved itself on the other hand a very important one.

Philadelphia district.—I am indebted for notes on this district to Mr. W. F. Leon, who has also in former years kindly contributed to my reports.

The mineral deposits of the district occur somewhat irregularly near granite rocks on the west, extending in a northerly and southerly direction, and slate and quartz, &c., on the east. There is one main fissure-lode now known, the Highbridge. The principal mining property on this lode is the El Dorado South, on which, with the exception of about 250 feet at the southern extremity, the vein of quartz is plainly traceable

throughout its extent. Varying from a bare trace to bold and magnificent cliffs, rising here and there above the surface, the croppings continue even into contiguous lands. Such outcrops are often unusually massive, and consist of a compact white quartz, richly clouded with dark and antimonial ores of silver. In the solid portions of the lode the silver-ores are scattered throughout the whole mass. Nearly the entire contents of this vein, above water-line, are in a more or less advanced state of oxidation and chlorination.

In the old works the vein varies from 15 to 40 feet in width, but the productive portion of the vein, the pay-stratum, also varies from 9 to 20 feet. The ore is found at times permeating the entire vein, at other times it lies nearest the hanging wall on top of the solid ledge. This property is owned by a company of San Francisco capitalists, and is now fairly under way to receive the fullest development. A vertical shaft (the Leon shaft) near the south end of the claim is being sunk to tap the ore-body known to exist from previous developments in the old incline works, but allowed to remain undisturbed until better facilities than those afforded by an incline could be completed. The company has a 20-stamp quartz-mill, with all the modern improvements, steam hoisting-works, with two powerful engines, a 10-inch Cornish pump, and all the necessary materials and machinery to work the property, which is under the immediate supervision of Mr. W. F. Leon, who is also one of the heaviest owners in the enterprise.

The Belmont Mining Company and its properties are next in importance. The works are situated some three or four hundred yards northerly from the property above mentioned, and on the same vein. This company has a vertical shaft, and is developing its mines in a systematic manner. In the earlier times of the district, the Highbridge and Transylvania, belonging to the company, were widely celebrated. The Old Combination Company's mines, situate north of the last-mentioned property, are lying idle, and have been so almost uninterruptedly since 1868. This property consists of a part of the Highbridge, the Constitution, and other mining locations. With the exception of the Highbridge, this property is wholly undeveloped. In consequence of the stagnation of this enterprise, the interests of Philadelphia mining-district have materially suffered. A 40-stamp mill and hoisting-works are still there, though in a somewhat dilapidated condition.

The El Dorado North, Arizona, Monitor-Belmont, Quintera, and other locations, at one time promising good returns to their owners, are now lying idle, the parties owning them preferring to await the development being made by the El Dorado South and Belmont Companies. There are three mills in the district, two of 20 stamps and one of 40, the two former belonging respectively to the El Dorado South Consolidated Mining Company and the Monitor and Belmont Mill Company, the latter to the Combination Company. To the former two mills Stetefeldt furnaces are attached, having a capacity to roast 20 tons of ore each per day. The combination mill has 10 reverberatory furnaces.

The deep workings now in progress in the El Dorado South and Belmont Mines will, it is hoped, prove the beginning of new prosperity for the district.

The ores of this district are of high grade, assaying often hundreds of dollars per ton. Beautiful crystals occur, rendered more beautiful by fanciful twistings and net-work of native silver. Besides the native silver, chloride of silver, antimonial silver, stromeyerite, sulphurets of silver and iron, stetefeldtite, and carbonate of copper occur. In nearly

every instance the best ores are associated with oxides of copper and iron, and in such cases the percentage of silver is always large.

Tybo district.—This district has assumed an importance during the last years which puts it second in rank as a lead-silver district in the State. I am indebted to Messrs. W. A. Skidmore and H. Degroot for the following report on the principal mining property, to which the district owes its reputation :

The property of the Tybo Consolidated Mining Company consists of mines and reduction-works, water-franchises, tram-ways, houses, shops, and various other improvements, the whole located along and adjacent to Precipico Cañon, a broad and deep ravine which at this point cuts the easterly slope of the Hot Creek Mountains at nearly right angles. Bordering this ravine on the south, and rising above it to a height of a thousand feet or more, is the rugged eminence known as Precipico Mountain. Striking diagonally across the cañon in a northwesterly and southeasterly direction, the croppings of a heavy mineral-bearing lode are clearly traceable. On this lode the mining-claims of the company (four in number) are located. The Crosby, the most northerly claim of the group, commencing near the center of the cañon, extends thence south 400 feet. As scarcely any work has been done on this ground, not much can be said about it, its value being derived from its position on an ore-channel of known fertility.

Adjoining the Crosby on the south is the Casket claim, embracing within its limits 666 feet. Two perpendicular shafts—one near either extremity of this ground—have been carried down to a depth of about 70 feet, a drift having been run from the bottom of the more northerly for a distance of 20 feet. In this shaft a streak of good ore from 3 to 3½ feet in thickness was struck, and some ten or twelve tons taken out, and there can be little doubt but further exploration will develop here a large and permanent body of good ore. Both of these shafts are well timbered.

On the Lafayette, a few rods to the west of the Casket claim, a shaft has been sunk to a depth of 60 feet on a line of well-defined croppings trending nearly east and west. From the bottom of this shaft a drift has been carried easterly in the vein-matter 70 feet, disclosing a stratum of medium-grade ore from 6 to 3 feet in thickness. The course of this vein indicates that it will intersect the dominating lode a short distance beyond the south boundary of the Casket ground; and it is reasonable to suppose that a marked enrichment of the main lode will ensue at the point of junction. This outlying ledge has not, however, been sufficiently exploited to determine either its course or dimensions with exactness, though its fertility seems to be pretty well assured. This claim is called the Lafayette, and covers a linear section of 1,200 feet.

The Two G Mine, so named from the initials of Gillett and Gally, its former owners, extends south from the Casket 1,200 feet. This, the only one of the company's claims yet thoroughly developed, has been opened up by means of three tunnels driven in and with the course of the ore-channel. These adits stand vertically the one above the other, having been started in the croppings of the lode which here stretch obliquely along the northerly face of Precipico Mountain, crossing it at an elevation of about 300 feet above the adjacent ravine.

This exposure of the lode has greatly facilitated its exploitation by the means here adopted; this series of tunnels, with their various connection, tending also to promote ventilation and the ready extraction of the ores from the mine. The lowest of these tunnels, designated No. 1, is 530 feet long, while No. 2, the next above, is 500 feet; and the uppermost, No. 3, is 200 feet in length. The latter penetrates the lode at a depth of 113 feet below the highest croppings. Tunnel No. 2 lies 100 feet below No. 3, and tunnel No. 1 38 feet below No. 2, these adits being connected by means of inclined winzes opened at suitable points along them. The material through which they are driven has proved so firm that timbering has been required at only a few spots.

The principal ore-bearing deposits in this mine seem to occur in the form of vertical shoots or chimneys standing between and inclining with the walls of the lode, and pitching toward the southeast. The dimensions of these ore-bodies are variable, ranging from 4 to 10 feet in thickness and from 30 to 60 feet in length. They are usually connected by seams of vein-matter or ore, the wall-rock coming in occasionally and compressing the latter to a very narrow limit, and at a few spots displacing them entirely. In the upper workings these contractions are more noticeable, nearly disappearing in the lower levels of the mine.

In the upper tunnel, No. 3, some good ore was encountered at intervals throughout its entire length. At the entrance of tunnel No. 2 the vein-matter, composed mostly of excellent ore, showed a thickness of about 4 feet. Fifty feet in from the mouth of the tunnel an uprise was made, which finally ran into wall-rock. Ten feet farther on the ore came in again rich and heavy, and so continued for ten or twelve feet, when it suffered another contraction, and for fifty feet on was very irregular, narrowing and expanding sharply from 1 to 6 or 7 feet. After a farther advance of 120 feet the ore

spread out to a thickness of 7 feet—all high grade—a short stoping having been carried up here to a height of 20 feet. From this point the ore held on contracting and expanding for a distance of nearly 300 feet, when a still heavier body set in, which was cross-cut for 8 feet without arriving at its western limit. Stopping was carried up in this chimney to a great height without reaching its apex.

After holding its lateral proportions for 25 or 30 feet, this chimney narrowed to 4 feet, and 20 feet farther on was cut off altogether by the invasion of lime-rock from the east. Deflecting the tunnel to the right 20 feet carried it through this obtruding mass and into another chimney of high-grade smelting-ore of unascertained thickness, a drift 8 feet in length having failed to cross-cut it. After penetrating this chimney south for a distance of 10 feet, work was here discontinued, leaving the face of the tunnel in the most promising body of ore yet opened up in the mine. As the irregularities of the ore in the tunnel above corresponded with those encountered here, it is inferred that this chimney will be intersected by the upper tunnel when the latter shall have been advanced another 150 or 160 feet.

The first 60 feet of tunnel No. 1 was run outside of and at a slight angle with the ledge. After running 70 feet the latter was reached and a shaft put down at the point of contact to a depth of 30 feet. In this shaft a sheet of good carbonate ore was exposed varying from 8 to 20 inches in thickness. The tunnel carried this sheet of ore somewhat enlarged in for a farther distance of 60 or 70 feet, where a winze was sunk to the depth of 75 feet. Before reaching this point the ore was stoped out nearly up to the middle tunnel, this stoping showing good ore on all sides.

One hundred and seventy-five feet beyond the first a second winze was put down to the same depth as the other, and the two connected at the bottom by a drift. Both of these winzes as well as the connecting-drift are in ore. Afterward tunnel No. 1 was pushed ahead until it had reached an entire length of 350 feet. It carries a stratum of ore ranging from 3 to 8 feet in thickness nearly all the way, and ends in a heavy body of high-grade galena and carbonate ores, being unquestionably the same in which the next tunnel above is terminated.

The drift at the bottom of the two winzes mentioned, and which is denominated the first level, has attained a total length of 365 feet. The belt of ore along this level suffers fewer lateral contractions than anywhere above, these shrinkages here amounting nowhere to an entire interruption of the vein-matter. For three-fourths of its length the ore-stratum maintains on this level an average thickness of about 6 feet, and is uniformly of a good, much of it of a very high, grade. Both extremities of this level are in strong bodies of ore; commencing at the innermost winze, a stoping 20 feet high has been carried south for the distance of nearly 100 feet. The face of this stoping is everywhere in ore.

The second level, like the first, is reached by means of two winzes each 60 feet deep put down at points in close proximity to the bottoms of those above. These two winzes have not as yet been connected below, 53 feet of ledge-matter remaining to be excavated between them. From the most southerly a drift has been run southeast 25 feet, making a total of drifting done on this level of 147 feet, nearly the whole of it being in good ore. The ore-bodies here are, in fact, much more compact, and the walls of the lode more regular than in the upper levels, pointing to a continued improvement in this respect. This, the lowest level in the mine, has a vertical depth of 323 feet beneath the highest point of croppings, being 388 feet measured on the inclination of the lode.

The entire length of the tunnels, drifts, shafts, and winzes, excavated in the "Two G" Mine, amount in the aggregate to nearly 4,000 linear feet, the established reserves holding, in June, 1875, about 55,000 tons of medium or high-grade milling and smelting ores, being enough to keep a 20-stamp mill and two furnaces of moderate capacity employed at least two years. Besides these reserves, there are now about 1,300 tons of ore lying in the main bin and on the several mining-dumps. The whole of this ore, both the extracted and that standing in the mine, ought to return an average net yield of \$20 per ton, and may be expected to exceed this, insuring a resultant profit of \$1,100,000 at the least.

These ores consist of two classes, the one composed of the carbonates and the sulphuret of lead, and the other of the chloride and sulphurets of silver, the former class requiring reduction by smelting, and the latter by the ordinary mill process. These two classes of ores occur in the mine sometimes at points widely separated, and again side by side; the galena usually lying next the foot, while the milling-ores adhere to the hanging-wall, these positions being occasionally reversed. Neither class of ores is difficult of reduction, each being manageable by the mode of treatment especially adapted to it. Being without means for handling them, the company have removed no more of their milling-ores than was necessary in prosecuting the work of exploration. In stoping and raising, only the smelting-ores have been extracted in quantity.

The strike of the Two G. lode, as before stated, is nearly northwest and southeast, or, to be more exact, it bears north 43° west, and inclines toward the east at an angle of 70° . It varies on the surface from 4 to 12 feet in thickness, manifestly gaining strength and symmetry with depth. It is a contact-vein lying between a compact,

siliceous limestone on the east and porphyry on the west, the vein-stone being composed chiefly of quartz. The walls are cased with a bluish clay, mixed with talc, and in the lower levels exhibit an evenness and solidity not observable above. The ledge can be traced by the croppings for a mile or more, the latter being everywhere well defined, and in some places very bold.

At a properly-selected point a main working-shaft has been started, having already reached a depth of 132 feet. This shaft contains three compartments, two designed for the hoisting and lowering, and the other for the pumping service. It is substantially timbered, and is outfitted with steam-driven hoisting-gear, cages, and other necessary appendages, and is protected by a suitable building. It will intersect the lode at a depth of nearly 500 feet, and through it the ore from the lower levels of the mine will be brought to the surface. At a depth of 125 feet in this shaft a drift has been commenced, and is being carried toward the vein, which will be cut at the present lowest level, 400 feet below the croppings. As the line of permanent water has not yet been reached, no pumping-apparatus will be required here at present, and probably not for some time to come. At the mouth of the lower tunnel a capacious ore-bin has been built, from which two tram-ways have been laid down, the one three-quarters of a mile in length, leading to the company's mill, and the other one-third of a mile in length, leading to the furnaces. Through the aid of these tram-ways the ores can be delivered at points where wanted at a trifling cost. In addition to these, many other improvements have been introduced and devices availed of for facilitating or cheapening the various processes and handlings to which the ores are further subjected.

At a point a little below, and convenient to their entire group of mines, the company has erected a smelting-furnace capable of running through 25 or 30 tons of ore per day. This is a very complete establishment, being supplemented with calcining, refining, and cupelling works, and all other appliances necessary to further operations and add to its effectiveness. The engine and blower employed here have sufficient power to run the additional furnace which the company design putting up very soon by the side of the present one.

At an eligible point on the opposite side of the cañon, and a little lower down, a 20-stamp mill has been erected. The cost of this structure was \$75,000. It is driven by a steam-engine of sixty horse-power, and has a capacity to crush and amalgamate 40 tons of ore every twenty-four hours. This mill has been planned and outfitted with special reference to economizing labor and securing the greatest possible efficiency, so that it is one of the best appointed establishments of the kind in Central Nevada.

From a group of springs situate two and a half miles west of the mines, the company has laid down 4-inch iron pipe, conducting a flow of nearly 3 inches of water to the reduction-works, where as much of it as may be required will be collected in large cisterns and retained for use; a tank, holding 20,000 gallons, having already been constructed on an eminence commanding the company's furnace. In order to concentrate and economize this water at its source, various cuts and tunnels have been excavated for gathering it up and carrying it to one spot, whence it is conducted under ground to its principal point of delivery, the several towns of Upper, Central, and Lower Tybo being supplied along the route. The iron pipe through which it is conveyed has been laid throughout its entire length in trenches cut deep enough, often through the solid rock, to protect it from the effects of frost or other causes of disturbance. Owing these springs, which are never-failing, the company will always enjoy a full and steady supply of water.

In addition to the foregoing, the Tybo Consolidated Mining Company has made many other improvements of a useful kind. Roads have been excavated, connecting the mines with the reduction-works; assay-offices and shops, with buildings for storage and business purposes, have been erected; houses for superintendent, workmen, and other employes have been put up; while all needed supplies of tools, coal, iron, and other material have been provided. The total amount of money expended by the company here in the purchase of mines and other properties, and upon improvements made in connection therewith, amounted to the large sum of \$500,000, the whole of which appears to have been laid out in a manner well calculated to insure the thorough development of the property and adding to its prospective value.

From Mr. M. D. Howell, the superintendent of the mine and works, I have, at the end of the year, the information that the developments of the mine from June to the date of writing have all been favorable, all the workings being in ore, of which enough was in sight to run the works during the coming year. The product during 1875 is given in the annexed statement.

Furnace and bullion journal, January 1 to December 31, 1875.

Date.	Tons ore.	Bushels coal.	Number of shipments.	Number of bars in the shipments.	Weight of shipments, pounds.	Assay-value, silver.	Assay-value, gold.	Assay-value, silver and gold.	Assay-value of shipments, gold and silver.	Value of lead.	Total assay-value, gold, silver, and lead.
1875.											
January 14 to 31.....	4763	18,840	43	843	85,247	\$1,676 36	\$160 50	\$1,836 86	\$15,755 93	\$2,907 46	\$18,663 39
February 1 to 28.....	719	28,301	6	1,189	120,120	2,078 20	221 73	2,299 93	23,022 94	3,900 00	26,922 94
March 1 to 20.....	4694	32,594	34	669	70,260	1,292 86	146 00	1,438 86	12,506 77	2,289 75	14,787 52
August 9 to 31.....	549	23,680	74	1,389	130,144	2,114 36	244 33	2,358 69	21,871 10	4,219 25	25,090 35
September 1 to 30.....	678	31,640	8	1,637	160,276	2,571 28	350 26	2,921 56	29,264 95	5,200 00	34,464 95
October 1 to 26.....	543	27,800	6	1,235	120,319	1,815 79	212 23	2,028 02	20,334 19	3,900 00	24,234 19
November 1 to 30.....	946	37,840	12	2,471	240,374	4,337 00	416 89	4,753 89	47,712 80	7,200 00	55,512 80
December 15 to 31.....	539	21,560	6	1,236	120,226	2,631 17	251 11	2,882 28	28,883 75	3,900 00	32,783 75

Reveille district, formerly well known on account of its rich but "pockety" mineral deposits, after having lain idle for several years, has again shown some life, of which the developments in the Gila mine were the main cause. On this mine I have obtained the following full report of Mr. H. Degroot, of San Francisco:

This mine is situate in the Reveille district, Nye County, State of Nevada, in a southerly direction from the town of Eureka. The lode on which the Gila claim is located courses along the easterly slope of the Reveille Mountains in a generally north and south direction. It consists of a well-defined belt of quartzite, much of it nearly pure quartz, being composed of 70 or 80 per cent. of silica and highly crystallized. This quartzite has an average thickness of 150 feet, inclines to the east at an angle of 60°, and is inclosed between porphyry on the east and a sienitic formation and porphyry on the west, the vein-matter of the lode being separated from the country-rock by the usual clay partings. About 500 feet to the west of the lode a lime-rock comes in, and overlying the other formations extends thence to the top of the mountain.

The Gila location embraces 1,200 linear feet, running with the course of the ledges. A deep ravine making down the easterly slope of Reveille Mountain cuts across the claim near its center, while a heavy dike of porphyry, having an easterly and westerly trend, covers up its southerly extremity for a distance of several hundred feet.

The lode can be traced north by an almost continuous line of croppings, in places very bold, for nearly two miles. Concealed for a space of 2,000 feet under this superimposed mass of porphyry the croppings re-appear at its further edge, and bearing thence southeast, can be followed for a long distance in that direction.

Upon this ground, though an early location, but little exploratory work had been done prior to January last. The former owners, having made some slight surface-excavations in the quartzite without obtaining any very encouraging show of ore, ceased operations and the claim was suffered to lie for several years thereafter with only this small amount of prospecting done upon it. Having come into the hands of new owners during the early part of the present year, work was resumed on the southerly side of the ravine mentioned, at a point on the lode where some faint traces of float-mineral indicated the existence of ore beneath. Within a foot of the surface, and covered only by the remains of the disintegrated ore-shoot, intermixed with the *débris* washed in from above, a horizontal layer of the carbonate of lead and chloride of silver was cut into. Starting at this spot a tunnel has been driven south into the vein 80 feet, its inner extremity being about 30 feet below the surface. Though of variable thickness along this tunnel the ore-sheet proved to be continuous, some 80 tons of rich carbonates and chlorides having been extracted therefrom. The flat-lying stratum of ore first struck was followed west 35 feet without compassing its limit in that direction. It varied in thickness from three to five feet and yielded a large amount of superior ore; a portion of which having been reduced by smelting returned over \$800 per ton. On the east this stratum commenced to pitch near the line of the tunnel, at which point a winze, designated No. 1, has been put down to a depth of 33 feet. This winze carried ore nearly all the way down, the porphyry coming in and cutting it off almost wholly at the bottom.

Thirty feet further in and 10 feet from the end of the tunnel another winze, No. 2, has been sunk to the same depth as No. 1. This winze is in fine ore throughout, the stratum being from 3 to 5 feet in thickness. A small air-drift connecting these two winzes at the bottom traverses a channel containing streaks and bunches, but not an uninterrupted body of ore. From the bottom of winze No. 2 a drift has been carried forward 40 feet, running all the way through and ending in high-grade ore, this body having an average thickness of about 4 feet. From this drift, termed level No. 1, a stopping has been raised to the tunnel above, all the way in ore. The face of this chimney, opening south, is manifestly shaping for increased strength and fruitfulness in that direction.

From level No. 1, and at a point about 35 feet from its southerly terminus, winze No. 3 has been opened to a depth of 60 feet, connecting with level No. 2 at its bottom. It is all the way in ore, the shoot along it varying from 2 to 3 feet in thickness. Through this winze all the ore above will be sent down to level No. 2, where it will be loaded on cars and passed out through the lower tunnel, now completed and traversed by an iron-railed tram-way.

At a point about 60 feet below level No. 1, and 100 feet below the highest croppings, a tunnel was started against the easterly slope of the hill and driven west at right angles with the course of the lode, which it reached at a distance of 142 feet from its mouth. At the point of intersection a body of superior ore from 3 to 4 feet in thickness was cut into. A drift, level No. 2, runs south from the tunnel, carries this body of ore on 40 feet, where it narrows down to a few inches. After holding this size for 5 or 6 feet, it again expands to a width of 1 foot, all of extremely high grade and tending to widen as the drift is being advanced.

About 15 feet from the southerly end of this drift a winze, No. 4, is being sunk, having reached at this time a depth of 10 or 12 feet. This winze is going down in a four-foot stratum of ore of the best quality yet uncovered. Some of this ore is so highly sulphureted that it will require to be roasted before it can be worked with any considerable degree of closeness. A drift extending north 10 feet from the lower tunnel shows the ore-body cut into by the latter to diminish and mix up with porphyry and barren vein-matter in that direction.

At a point about 175 feet north from the entrance to the lower tunnel the sinking of a main working-shaft has been commenced and will be prosecuted with all practicable expedition. This shaft it is calculated will intersect the ledge at a depth of 286 feet, and very near the center of the claim. When down about 100 feet, where it is expected that a good deal of water will be encountered, steam hoisting and pumping gear will be added. From this shaft, which will be put down to the lode in about sixty days, drifts will be run off at suitable intervals to the lode for the purpose of ascertaining its pitch and the character of the ore-bodies.

The ores extracted from the Gila Mine have been nearly all reduced at the company's 10-stamp mill, a structure well outfitted with amalgamating apparatus and the ordinary equipments necessary in an establishment of this kind. When built, this mill was located on the westerly side of Reveille Mountain, at the only point where, as was then supposed, sufficient water for its use could be obtained. It has capacity ample for the present requirements of the mine, and will probably answer every purpose until such time as more extensive ore developments shall have been made. When a demand for enlarged milling facilities shall arise, the proper point at which to erect the new mill will be a little below the mouth of the working-shaft now being put down, and to which the ore-cars could be run, thereby avoiding rehandling and saving wagon-transportation.

The ores of the Gila Mine have heretofore been decomposed ones, usually chloride of silver and the carbonate of lead, with a small percentage of antimonial and a considerable quantity of sulphureted ores, the latter increasing in the lower workings of the mine at a rate that will necessitate the early erection of a furnace for their chloridization. Mixed with these varieties of ore occurs a trifling amount of iron, copper, and arsenical pyrites, galena, black oxide of manganese, calc-spar, talc, &c. The ores are uniformly of high grade, the quantity reduced under the present administration to June 25, 1875, 610 tons, having yielded at the rate of \$246.93 per ton. Some small lots of assorted ore previously worked went much higher, running from \$325 to \$855 per ton. As the quality of the ores here seems to improve with depth, the future promises a higher working average than has yet been attained. Since adopting dry-crushing, the ore has been milled up to 80 per cent. of the pulp-assay, over \$60 of every ton of ore being still left in the tailings, which are, of course, preserved for future treatment. With roasting, from 90 to 94 per cent. of the silver contained in the sulphureted ore could be saved. Nearly everything extracted from this mine is sent to the mill, not more than 4 or 5 per cent. of the whole being rejected. The bullion turned out runs generally from .915 to .955, some of it going as high as .989 in fineness.

Starting up the mill in the latter part of March, a run was made on 48 tons of ore, when it became evident that a change from wet to dry crushing would have to be

made. In effecting this change the most of the month of April was consumed, the mill remaining idle meantime. During the month of May the mill ran without interruption, turning out \$73,367 in bullion, an amount that will be nearly equaled in June, it being estimated that five days will be lost in this month, caused by stoppages for replacing old with new bearings, cleaning up, &c.

Work is now being steadily and vigorously prosecuted in the stopes raised from levels 1 and 2, as well as at the southerly extremities of both; also in winze No. 4 and upon the main working shaft; the business of exploration being everywhere pushed simultaneously with that of ore-extraction. By the observance of this prudent policy, ample provision will have been made for the pumping and hoisting service by the time it will come into requisition, while fresh reserves will be opened up more rapidly than those already established will be exhausted.

The Gila Mine has now been explored to a vertical depth of 130 feet; the amount of ore developed in the various levels, winzes, cross-cuts, and stopings amounting to 2,600 tons.

The actual cost of extracting, hauling, and milling the ore amounts here to about \$19.50 per ton, including dead-work.

At the time of the visit of Mr. Degroot the active history of the Gila dated back only five months. Yet results had been attained which in most other cases would have taken years to bring about.

During the latter part of the year the Gila continued to produce considerable bullion, as may be seen in the report of the State controller, given elsewhere in this volume.

EUREKA COUNTY.

The principal district of this county, that of Eureka, has continued to yield argentiferous-lead ores freely. The Eureka and Palisade Railroad having been finished in the last quarter of the year, the camp is now better situated for transportation than it ever was before, and it is now possible to bring fuel for smelting from a distance cheaper than it can be furnished by the district itself. During the year past, however, very little coke has been used except by the Richmond Company.

In the early part of the year, the Eureka Consolidated Company struck in its seventh and eighth levels a body of high-grade lead-ores, which created at the time considerable excitement in the San Francisco stock-market. A very extensive caving of the soft ore and gangue (brown oxide of iron) soon after destroyed the usefulness of the discovery, since ore and gangue had become so mixed as to lower the grade of the former too much to permit much profit in extracting and treating it. Yet the furnaces of the company were employed actively during the greater part of the year. According to a statement kindly furnished me at the end of the year, the total amount of bullion produced was 11,093,169 pounds, valued at \$1,869,392.04. No annual report has been published by the company, and further information than the above has been refused. My deputy, Mr. Eilers, having visited the mine shortly after the occurrence of the above-mentioned cave, when the extent of the so-called "bonanza" could not be estimated, although the exposure of good ore could be viewed at several points, I can only say that the rich ore-body seemed at that time to extend vertically from a point a little below the sixth level to the eighth, while its horizontal extent in the seventh level was not over 80 feet, and in the eighth level only strings of rich ore in the brown iron-ore, from a few inches to several feet wide, had so far been found.

With data in regard to the production of the Richmond Mining Company I have been kindly supplied by Mr. O. H. Hahn, who has for years been one of the most highly valued contributors to my reports. The fol-

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lowing table is taken from the records of the smelting-works, except the figures for the last week in December, which are estimated :

Month.	Net tons Rich- mond ore.	Net tons pur- chased ore.	Total tons ore.	Tons lead in ore.	Ounces—		Tons lead pro- duced.	Contents.	
					Silver in ore.	Gold in ore.		Silver.	Gold.
January.....	2,338.50	106.75	2,445.25	593.732	75,691.96	2,699.34	531.250	Ounces. 70,243.00	Ounces. 2,036.41
February.....	2,537.25	69.50	2,606.75	565.145	64,945.44	2,545.22	471.000	61,993.02	2,149.55
March.....	2,098.13	59.75	2,157.88	498.783	57,393.07	2,854.03	481.071	54,559.00	2,740.60
April.....	684.75	90.00	774.75	161.750	19,798.99	745.38	140.250	17,268.42	698.31
May.....	1,677.44	129.87	1,807.31	389.291	55,045.15	1,790.99	391.000	49,283.02	1,791.33
June.....	2,682.19	83.37	2,765.56	666.666	70,707.52	3,194.48	650.772	81,687.07	3,221.77
July.....	2,728.87	62.42	2,791.29	567.553	75,457.01	2,993.89	650.242	86,895.48	2,803.64
August.....	2,667.04	86.37	2,753.41	522.309	70,877.17	2,640.06	550.202	75,051.34	2,552.91
September.....	2,617.54	66.28	2,683.82	455.162	53,677.69	3,384.04	507.688	60,907.24	3,433.97
October.....	2,988.75	166.55	3,155.30	521.022	60,727.06	4,037.53	460.991	52,342.46	4,568.44
November.....	2,750.27	179.90	2,930.17	552.096	74,010.50	3,322.01	467.800	59,973.09	2,123.53
December.....	3,207.82	152.62	3,360.50	638.495	84,879.80	3,809.88	557.737	69,204.00	2,331.34
Total.....	24,958.61	1,253.38	26,212.00	6,037.995	763,211.38	34,016.85	5,860.003	739,407.20	28,457.80
Deduct contents of litharges, dross cupel-bottoms, &c., smelted with the ore.								1,083.648	789.96
Total.....								4,776.355	700,686.18

Gross value of lead in ore, at \$80 per ton	\$483,039.60
Gross value of silver in ore.....	986,755.99
Gross value of gold in ore.....	703,189.51

Total value lead, silver, and gold in ore..... 2,172,985.10

Gross value of lead in bullion.....	382,108.40
Gross value of silver in bullion.....	905,917.16
Gross value of gold in bullion.....	572,284.36

1,860,309.92

About 84 per cent. of this is net.

Losses, lead, 20.9 per cent.; silver, 8.19 per cent.; gold, 18.48 per cent.

The ore is smelted with an addition of from 7 to 10 per cent. of quartz and 20 to 25 per cent. of slag.

Consumption of fuel, 40 bushels of coal, (without waste,) or its equivalent in value in coke per ton of ore.

Cost of extraction, hauling, and reducing the ore and purchasing of outside ores, \$39.

Number of furnaces: 3 of a capacity of 40 tons of ore each, with 9 tuyeres; 1 water-jacket furnace of the Kast pattern, with 6 tuyeres, running through from 12 to 18 tons of ore per 24 hours; and 1 other water-jacket of larger size building.

Auxiliary plant: 1 steam-engine, 22 and 34 inch cylinder, making 42 revolutions per minute; 3 boilers; 1 Knowles steam-pump; 2 Cameron steam-pumps; 3 Sturtevant blowers, No. 8, making 2,000 revolutions per minute; 1 Root blower, No. 6, making 110 revolutions per minute; 1 Blake crusher; 1 Howland grinder, and 1 Wagner grist-mill.

The cause of the above enormous loss of gold has not been ascertained sufficiently; it is supposed to be in consequence of fine particles of metallic gold distributed through the ore escaping out of the furnace-chimneys. The flue-dust is worked over in a very crude manner, by mixing it with 20 per cent. of clay in the form of a thick paste, and then

throwing it wet into the furnaces along with the ore. Besides the injurious effect of the clay, this method is objectionable on other grounds.

The use of coke has not proved financially economical. It costs about \$60 a ton at the works, which would be equal in cost to 200 bushels of charcoal; the metallurgical effect is not in this proportion. It can be used only in admixture with one-half of charcoal, by weight, as the ore is principally pulverulent and packs so tight that the blast cannot penetrate the coke. The coke is charged from the center forward, but has a bad mechanical effect on the furnace-walls, which have to be repaired every day. The water-jacket furnace, a modification (not improvement) of the excellent Kast furnace, was built with a view to avoid these costly repairs, but has proved an economical failure thus far. Its consumption of fuel is 56 bushels per ton, and the mechanical volatilization or formation of dust seems to surpass that of the furnaces of the old pattern. To judge by the consumption of charcoal alone, the Richmond furnaces seem to be the worst-constructed ones of the district, the K. K. furnaces using 31.4 bushels coal per ton, Eureka 32 bushels, and Atlas 34 bushels.

The refinery plant of the company consists of 1 boiler, 6 sets of crystallizers, (a set comprising 1 melting-pot and 1 crystallizing-pot, and 3 steam-cranes serving this apparatus;) 2 softening-furnaces, holding about 35 tons of bullion each; 5 Welsh cupelling-furnaces; 1 dross and litharge reducing-furnace, and 1 kiln for burning bones. The crystallizers are provided with hoods, leading into condensing chambers, for the saving of oxides.

The process is Lucien Rozan's modification of the Pattinson, described in the *Annales des Mines*, tome iii, livr. 2, de 1873, and requires here 10 operations to obtain rich lead on the one hand and market-lead on the other. The gold disappears from the latter only after the eighth operation. The lead to be treated must be pretty well freed from arsenic, otherwise the crystals run out with the rich lead. It takes 48 hours to soften 35 tons, which yield about 11½ per cent. of dross. The refinery is only running at half capacity, one-half of the calcined bullion being shipped to Omaha. The reported cost of separation is \$20.42 per ton of lead.

The Atlas Mining and Smelting Company, formerly the Ruby Consolidated, owns, in addition to the mines named in former reports, the Atlas mine, which is the northerly extension of the Dunderberg. The ores treated by the company during the year came mostly from the northern portion of the Dunderberg, in the 200, 300, and 400 foot levels. A small portion was taken from the Pleiades, the ore being poor and the deposit soon exhausted. The 500-foot level in the Dunderberg is opened, running for 470 feet along a clay wall, but up to the time of Mr. Eilers's visit, in September, no ore had been struck, and the company was then running a drift from the 400-foot level across a stratum of shale, from 200 to 300 feet thick, in an easterly direction, in the hope of finding contact-deposits of ore between the shale and limestone on the farther side of the shale. There is the more ground for this hope, as the limestone croppings above are strongly impregnated with oxide of iron. It is contemplated to sink a vertical shaft in the new Atlas ground, on the north slope of the Dunderberg hill, and to remove the present hoisting-works at the incline to this shaft, from which the whole mine can be worked more economically than at present, because all the ore-bodies seem to lie in this direction. The company has bought all the custom-ores it could get during the year at the following prices:

For ores assaying 50 dollars per ton, 16 per cent. of value.

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For ores assaying 60 dollars per ton, 25 per cent. of value.
 For ores assaying 70 dollars per ton, 35 per cent. of value.
 For ores assaying 80 dollars per ton, 43 per cent. of value.
 For ores assaying 90 dollars per ton, 45 per cent. of value.
 For ores assaying 100 dollars per ton, 50 per cent. of value.
 For ores assaying 150 dollars per ton, 55 per cent. of value.
 For ores assaying 200 dollars per ton, 58 per cent. of value.
 For ores assaying 225 dollars per ton, 60 per cent. of value.
 For ores assaying 250 dollars per ton, 62 per cent. of value.
 For ores assaying 300 dollars per ton, 63 per cent. of value.
 For higher grade ores, rates were established by special agreement.
 Lead, over 20 per cent. was paid for at the rate of 40 cents a unit.
 As in former years, Mr. O. H. Hahn has furnished me full data in regard to the company's smelting operations.

Average assays per ton.

Atlas fine ore:	
Silver.....	17.960 oz. = \$23 22
Gold.....	1.235 oz. = 25 53
	48 75

Lead, 22.6 per cent.

Atlas coarse ore:	
Silver.....	29.650 oz. = 38 33
Gold.....	1.187 oz. = 24 58
	62 91

Lead, 30.6 per cent.

Average of Atlas ore:	
Silver.....	23.400 oz. = 30 25
Gold.....	1.214 oz. = 25 09
	55 34

Lead, 26.32 per cent.

Purchased ores:	
Silver.....	49.780 oz. = 6 436
Gold.....	1.000 oz. = 2 067
	85.03

Lead, 19.58 per cent.

Atlas and purchased ores:	
Silver.....	24.340 oz. = 31 47
Gold.....	1.206 oz. = 24 93
	56 40

Lead, 26.03 per cent. ; moisture, 5.9 per cent.

Average contents of bullion produced:	
Silver.....	103.310 oz. = 133 57
Gold.....	5.499 oz. = 113 67
	247 24

Atlas Mining and Smelting Company's smelter's report for the year 1875.

Date.	Tons of ore smelted per twenty-four hours.										Bushels charcoal per 24 hours.	Number of bars produced.	Weight of bullion.	Number of bars in shipment.	Weight of shipment.	Slag used as flux.	Per cent of slag used as flux.	
	Atlas ore.		Custom-ore.						Total.	Actual ly used.								Recoveried in bin.
	Fine.	Coarse.	New-ark.	Ham-burg.														
April	337.5	344.2						701.7	32,750	31,368	3,069	383,738	3,048	361,374	463,620	231.81	33.0	
May	771.5	566.4	31.1		Nonsuch, 3.3			1,362.3	43,015	42,309	5,611	483,243	5,597	482,202	1,044,000	532.00	38.3	
June	730.4	537.3			Wide West, 7.4			1,268.1	43,050	41,928	4,257	414,803	4,923	421,313	1,024,602	541.301	42.1	
July	607.1	472.1			Banner, 10.5	Star of Eur., 8.9		1,083.6	38,570	36,454	4,974	428,715	4,936	430,866	941,370	470.635	42.8	
Aug.	609.2	488.9	23.8		Lee, 1.8	Orange, 1.5	French, 8.1	1,133.3	42,560	40,350	5,063	433,948	4,944	431,356	1,142,675	571.375	50.4	
Sept.	248.0	117.2	7.9	44.8	Diamond, 6.3			424.2	15,963	15,108	2,364	201,428	2,572	219,112	407,960	203.6	48.0	
Nov.	307.6	323.4		52.2	Banner, 12.1	Morrison's Glory, 6.4	San Jose, 8.9	724.4	26,950	24,920	4,792	383,902	4,773	400,764	593,800	298.9	41.0	
	3,631.3	2,871.5	52.8	97.0	34.0	36.0	17.0	6,729.6	232,638	222,437	30,749	12,611,777	30,622	2,626,967	5,675,167	2,837.36	42.16	
	236.8 tons custom-ore.																	
Purchased from													Bars.					
													K. K.					
													59					
													Moeller					
													33					
													Richmond					
													92			16,246		
													30,730			2,610,141		
													19			1,026		
													30,749			2,611,767		
																		1,305.8835 tons.
On hand January 1, 1876.																		

On hand January 1, 1876.

Charcoal purchased, 944,289 bushels; charcoal consumed, (by tally-boards,) 222,437 bushels. Loss, 21,662 bushels, or 8.94 per cent.

Consumption of charcoal purchased, per ton of ore, 36.3 bushels. 5.15 tons of ore produced one ton of lead. 3.5 per cent of the ore smelted was purchased ore.

Number of furnaces, 2; only one running at a time. Number of runs made during the year, 3, of respectively 100, 49, and 30 days, according to the quantity of ore and coal at hand.

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ATLAS MINING AND SMELTING COMPANY.

Contents of ores smelted during the year 1875, according to the weekly assays.

Description of ore.	Tons of ore, gross.	Tons of ore, net.	Tons of lead in ore.	Ounces of silver in ore.	Ounces of gold in ore.
Atlas fine ore.....	3,621.3	3,267.90	738.612	58,738.60	4,037.019
Atlas coarse ore.....	2,871.5	2,839.51	868.922	84,197.18	3,377.640
Custom-ores.....	236.8	225.03	44.080	11,203.87	226.904
Total.....	6,729.6	6,332.44	1,651.614	154,139.65	7,641.563

Contents of bullion produced.

Number of bars made.	Weight of bullion in pounds.	Ounces of silver in bullion.	Ounces of gold in bullion.	Total value of bullion in gold and silver.
30,841	2,628,613	135,551.63	7,203.394	\$394,235.80
Less bullion purchased... 92	16,846	641.68	22.090	1,286.40
30,749	2,611,767	134,909.95	7,181.304	322,949.40

* = 1,305.8835 tons.

Relation between contents and production.

	Tons lead.	Ounces silver.	Ounces gold.
Contents of ore.....	1,651.6140	154,139.65	7,641.563
Produced therefrom.....	1,305.8835	134,909.95	7,181.304
Loss.....	345.7305	19,229.70	460.259
Loss in percentage.....	20.93	12.47	6.02

The average assay of speiss produced during the year was:

Silver, 15.09 ounces.....	\$19 51
Gold, 0.815 ounces.....	16 86
	36 37

And of slag:

Silver, 0.5 ounces.....	\$0 66
Gold, trace.	
Lead, 2.38 per cent.	

The K. K. Consolidated Mine has been worked throughout the year, at times with very flattering prospects for the future. The fifth level from the vertical main shaft, on which there are splendid hoisting-works, has reached the main ore-channel of Ruby Hill, and a considerable quantity of good ore has been found, though most of the ore is still of low grade, as heretofore. Mr. W. S. Keys, the superintendent, reports the following yield for the year 1875:

Month.	Ore reduced.	Bullion produced.	Gold and silver.
	Tons.	Bars. Pounds.	
January.....	363	883 80,921	\$14,800 00
July.....	1,434½	2,726 253,686	48,188 50
August.....	194	467 43,530	8,161 90
November.....	1,230	3,104 290,889	28,600 00
December.....	1,445	6,240 584,395	66,251 00
Total.....	4,670½	13,420 1,253,401	166,001 40

The value of the lead at \$80 per ton, \$50,120, added to the above, gives the total yield of the mine for 1875 as \$216,121.

Of the other mines worked in the district during the year, none have reached results worthy of special mention. Their product is included in the returns of the Richmond and Atlas Smelting Companies, but cannot be separately ascertained. At the end of the year none of the principal mines of the district was in very good condition, though all of them had fair amounts of ore in sight. The prospects for the near future of the Richmond Mine, in particular, were considered less favorable than heretofore.

HUMBOLDT COUNTY.

For data on the mining industry of this county I am, as in former years, indebted to Mr. D. Van Lennep, M. E., now of Winnemucca, Nev.

In taking a retrospective view of the mining interests of Humboldt County, one cannot but feel that the final results of several mining and reducing enterprises, promising well at the beginning of the year, are very discouraging at the close, the stringency in the money-market aggravating the gloomy aspect of affairs.

This year, as heretofore, abandoned mills attest to the folly of hastening to build works for the reduction of ore before a steady and adequate supply has been assured. On the other hand, many enterprises have been hindered or ruined by the attempt to make the mines pay their own way from the beginning, and furnish from their profits the necessary capital for machinery and reduction-works. This may in some cases be done, when custom-mills are at hand and the surface-ores are rich. But many valuable mines are unable to carry the burden of self-development; and many are seriously injured by the robbery of their richer ores and the neglect of substantial timbering and systematic working which too often attend the endeavor. If the misplaced or premature expenditure of capital is a frequent source of failure, the withholding of it is often not less unfortunate, as the present condition of many promising mines in this county testifies.

The high price of labor is a great obstacle to the development of the mines of the county, which carry, on an average, low-grade ores in small ledges. The close vicinity to the Comstock lode seems to be in the way of obtaining a reduction of miners' wages.

During the fall of this year, however, there being no demand for miners, many have gone to work at \$3.50. Chinese labor is, for these reasons, coming more in favor every year, especially for such mines and works as would have to be closed if worked by high-priced labor.

In *Buena Vista district*, the Arizona Mine has been worked steadily through the year. The mine has not been paying, and two assessments have been levied of \$1 each per share. The number of tons extracted during the twelve months amounts to 3,285. The ore was reduced at the Arizona Mill, at Unionville, and about five tons of higher grade were shipped away for reduction. The force at work in the mine has not been as great as in former years, nor has the mine been worked in depth. The new tunnel begun last year, to connect the works west of the McDougal shaft in a nearly level and straight line to the surface of the hill, was finished this year. The ore extracted has been mostly from this portion of the mine, some having been obtained also from the part known as the Eastern spur, from the Stewart ledge, and from the Manitowoc ledge. Another break in the ledge was encountered in the western portion of the mine, beyond the McDougal shaft. The richness of

the ledge has diminished at all the points worked, especially on the western side, going up on the ledge toward the outcrop. At the end of the year the average assay of the pulp at the mill is estimated at \$30 per ton.

The Arizona Mill has been kept at work on ore or tailings throughout the year with little interruption, except for repairs. The four Varney pans have been replaced with three Wheeler's. The mill has now 20 stamps and 8 Wheeler pans. The silver or tailings mill has not undergone any change worth noticing. At the end of the summer and during the first part of the fall it had to stop on account of the scarcity of water in the cañon. The castings for these two mills (pan and battery dies and shoes) have been cast by the Mill City foundry.

The Henning Mine fell, by reason of an attachment and judgment in favor of J. C. Fall, out of the hands of the Pioneer & Inskip Mining and Milling Company. Two miners and several Chinamen worked the mine the greater part of the year. The portion of the ledge on the south and near the mouth of the south tunnel was found to be rich, and a considerable amount of ore was taken out. Some was reduced at the Pioneer Mill, in the summer, when the supply of water was sufficient to run. About 40 tons was sent to the Humboldt Reduction Works, in Winnemucca, and the remainder awaits reduction at the Pioneer Mill.

The Pioneer Mill is in the hands of J. C. Fall, for the same reason as that stated above in connection with the Henning Mine. The mill was run during the first part of the year on Henning and Millionaire ore until the water failed. Since this time alterations are being made in the mill. The principal one is the replacement of the small engine by a larger one, powerful enough to run the pans and the battery by steam only when the water fails. The mill was nearly ready to run at the end of the year.

Some prospecting has been carried on in the district during the year, but no permanent bodies of good ore have been discovered.

The antimony mine has been worked steadily, most of the year by Chinese labor, ten to twelve men having been employed, with a white foreman to direct their work. Several hundred tons of sulphuret of antimony were shipped to the Starr Smelting Works in San Francisco. The exact amount is not known, the owner, O. M. Evans, having died suddenly in the month of August. Two months after this occurrence, the mine was leased to the parties who now ship the ore to San Francisco.

The Millionaire was worked by running an incline on the ledge and following the same dipping into the hill (with more than one break) for 100 feet. The ledge widens in places, but is barren.

The principal stockholder, Mr. Hill Beachy, having died suddenly last summer, the work on the mine was stopped. After a while it was resumed, but only to take out the rich ore, which lies between the outcrop and the first break. The ore taken out has been reduced by the Pioneer Mill, the Humboldt Reduction Works, and a few tons by the Torrey Mill, near Oreana.

The shipments of bullion from Unionville in 1875 were :

In silver bars	\$140, 249 40
In gold bars.....	8, 651 00
Total, (coin-value).....	148, 900 40

The gold comes from the gulch-washings in Indian district, near the Eagle Mine, and also from gulch-washings on a small scale in Congress

Cañon, above Unionville. Some of the bullion taken out of the Eagle Mill was also shipped through Unionville.

Indian district.—The Eagle Mine enterprise had many reverses during the year. The main shaft had been sunk to the water-level, (over 200 feet,) when it became necessary to have a pump. Hoisting-works had been erected to sink the shaft. Drifts on each side of the shaft had developed a strong ledge, but the rock put through the mill was found to be poorer on the average than had been anticipated. On this account changes were made in the mill so as to amalgamate the gold in the battery and dispense entirely with pans. The change in the process was thought sufficient to amalgamate the free gold, (contained in the ore in larger proportion than silver,) and necessary to work larger quantities of ore, and thus reduce the expenses of reduction. There were two parties among the stockholders struggling for control, and they finally went to law, but legal proceedings were arrested by a compromise, one party selling out to the other. The party in possession, however, failed to pay the debts of the company, and the property was attached by the creditors. This was the state of affairs at the end of the year. The high anticipations entertained for this district at the beginning of the year have therefore been disappointed. Some of the men employed by the Oakland Mill and Mining Company, at the Eagle, being out of employment by the suspension of work at the mine and mill, worked and washed some of the gulches in the vicinity of the mine. The free gold obtained is reported to have been enough to pay them wages.

The Black Hawk Mine has been prospected during the year by the discoverers, Scott and Spray.

At Oreana a run was made on a smelting-furnace erected about five years since by Mr. Strout to work the ores of some mines in Arabia district. The parties who made this run had small means, and the first attempt having failed, their creditors forced them to suspend operations.

The Torrey Mill, on the Humboldt River, two or three miles from Oreana, has run at intervals, when the currents of the river would allow.

The Oreana or Montezuma Smelting Works have been idle throughout the year.

In *Relief district*, the tunnel of the Batavia and Pacific Mine has been run to the ledge. No ore was extracted during the year from the mine, and the mill has been idle.

Some copper-ledges were discovered in the southern part of the district, but little work has yet been done on them.

Farther south, east of Relief district, some old locations in Table Mountain have been prospected considerably. The largest ledge carries argentiferous galena. These locations are in Churchill County, near the line of Humboldt County.

White Cloud district.—This district, about twenty miles farther south, in Churchill County, on the same range of mountains as Table Mountain, on the northeast side of the Carson sink, and about two miles east of the old stage-route from Unionville to Stillwater, contains many locations of copper-ledges. Some of these have been prospected considerably in former years, and again during the present year the White Cloud ledge has been worked by the White Cloud Consolidated Mill and Mining Company of Oakland, Cal.

In the same range of mountains are found deposits of magnetic-iron ore.

Northeast of this district, in Humboldt County, on the west side of Pleasant Valley, ledges of sulphuret of antimony were discovered dur-

ing the year. All the discoveries mentioned above are far from the railroad, and therefore not favorably situated for present development.

Jersey district.—A few of the discoveries in this district have been steadily prospected during the year. Some of the ores extracted were shipped to Salt Lake, Sacramento, and San Francisco for reduction and for sale. The Jersey Mine changed hands in the fall of the year, Frank Hamilton, J. Sevenoaks, and others having bought the mine at the reported price of \$40,000, coin, and one-tenth of the capital stock. The ledge runs in a southerly and northerly direction, and dips westward. It is from 8 to 10 feet wide. The ore is about half galena and half carbonate of lead. It is said to carry from 33 to 60 per cent. of lead and to assay in silver from \$70 to \$190 per ton. The mine is worked through two drift-adits, running on the course of the ledge, in opposite directions, from the bottom of a ravine, which cuts the ledge at right angles to its course. Northward the drift is about 300 feet long, and southward about 50 feet. A furnace is building to treat forty tons in twenty-four hours. Wood is found in abundance twenty to twenty-five miles from the district.

Gold Run district.—At Greggville, the Manati Mine has been prospected during the year, but with poor results, no body of ore having been found.

The mine of Sterling & Agnew, and also the Thiers Mine, both small, rich ledges, were worked by the owners. A few tons of high-grade ore from each mine were reduced at the Humboldt Reduction Works.

The Holt Mill in this district has run irregularly. The owner, G. W. Holt, died in February. The mill was rented, and run only a few months in the summer, mostly on tailings.

The shipments of bullion from Golconda Station, the nearest to the district, were about \$3,000 during the year; all from the Holt Mill.

In *Winnemucca district* several discoveries of small ledges have been made, the most important being the Fairmont. The discoverer, J. W. Clemo, a Cornish miner, has worked it in a small way; the ore obtained having been reduced by the Humboldt Reduction Works.

The Pride of the Mountain has been worked most of the year by ten to fifteen miners and about eight Chinamen, who have extracted from three to four tons per day. The mine is owned by the Humboldt Mill and Mining Company, and the ore is reduced at the works of the company. It assays from \$40 to \$70 per ton.

The Union Series, and also the E Pluribus and Champion Mines, have been worked for several months by a few men. The veins of all these mines, except the Champion, are small, (from 12 to 18 inches wide,) with very base minerals (antimony, lead, iron, arsenic) imbedded in soft vein-material, which can be easily picked, so that no powder is used in the workings. The Champion ledge is larger, and contains more quartz; the ore is mostly earthy carbonate of lead. All these mines are located on the southwest side of Winnemucca Mountain. Their development during the year shows that the yield of the ore per ton in the first-mentioned mines is very variable, and may be put down at from \$35 to \$80, of which from \$2 to \$6 is in gold. The Champion ore is of a lower grade, ranging from \$25 to \$35. Specimens are obtained from all these mines which assay several hundreds of dollars to the ton.

The Humboldt Canal Reduction Works and Canal, and the Pride of the Mountain Mine, owned by Ginaca & Gintz, were incorporated under the name of the Humboldt Mill and Mining Company, in the early part of January, in San Francisco, with 60,000 shares. The canal was constructed, at very great expense, in the early days of mining in Hum-

bolldt County, for the purpose of obtaining the necessary motive-power for the numerous mills at that time thought necessary for the reduction of the immense anticipated ore-supply. The canal has never been used, and was not even finished according to the first plan of the enterprise. The Humboldt Reduction Works consist of a 10-stamp mill, (dry-crushing,) with a drop furnace to roast and chloridize the pulp; and four pans and two settlers for amalgamation. It crushed from 8 to 12 tons in 24 hours, according to the kind of ore and the fineness of screen employed. The pulp is dropped and blown in by a bellows, with a certain percentage of salt. It drops to the bottom of a square tower through the flames of two fire-places, placed one on each side. When the tower is filled to a level with the fire-places, the pulp is drawn by opening a damper or gate at the bottom. It comes out in a glowing state, and is usually spread on a floor and sprinkled with a hose, after which it is taken to the pans for amalgamation.

The mill has been running since July, nearly half the time on custom-ore. The company pays 80 per cent. of assay-value of ores assaying less than \$400, and 82 per cent. for ores assaying over \$400 per ton. They charge \$25 per ton for working 10 or more tons, \$30 per ton for 1 to 10 tons, and \$35 per ton for anything less than one ton, (except very small quantities.) Bullion is reckoned at market-value, less charges necessary to convert into coin or drafts on San Francisco. The variety of ore which must be worked with a slight knowledge of the proportion of their constituent minerals and metals is not calculated to favor a very close reduction of the precious metals. The furnace is not adapted to roasting and chloridizing ores containing a large percentage of base sulphurets. Such ores are worked successfully only by mixing them in small proportions with oxidized and quartzose ores. The ores containing much sulphur could be successfully worked in these works by subjecting the ores to a preliminary roasting in heaps. No attempt is made to save either lead or copper.

The ores worked by the mill during the year came principally from Humboldt County; a few tons were brought from Silver City and Wagontown, Idaho; and a few from Cherry Creek, Lewis district, Toano, Tuscarora, Galena, and Austin, were reduced at the mill.

The shipments of bullion during the year from Winnemucca amount to \$100,723. Most of this came from the Humboldt Reduction Works; the rest, a small amount, from Golconda, and from \$2,000 to \$3,000 from Bartlett Creek.

In *Paradise district* prospecting only has been carried on.

Columbia district is located on and near Bartlett Creek. Two mills have been erected in the district. The Badger Mine was sold during the year to the Badger Mill and Mining Company of San Francisco, which built the Badger Mill; but the company having failed in the agreement about the Badger Mine, the latter returned to its former owners, after which the company bought the Independent Mine. It made one run on Independent ore at the mill, then shut down, and failed to pay its hands. The Independent Mine having been bought conditionally it reverted to the former owner. The Badger Mill is situated near the mouth of the cañon on Bartlett Creek. It is a steam-mill, running five stamps, and amalgamating in the battery. It has one pan.

The owners of the Badger Mine, after coming into possession again, made an arrangement with one of their number to build the Florence Mill on Bartlett Creek, above the Badger. It is run by a hurdy-gurdy wheel, put in motion by the water of the creek, and has five stamps and one pan. Amalgamation is carried on in the battery, the gold being

free, and there being but little silver. The mill started last May and ran with little interruption until the middle of December, on Badger ore and custom-ore from other mines in the district. The charge for working is \$6 per ton. The old arrastra in which the first ores of the district were worked is still in its place, about midway between the two mills. Several other mines have been prospected and worked to some extent, and ores yielding sometimes as much as \$40 per ton, mostly in free gold, have been extracted.

Sierra district.—Another attempt was made during the summer and fall to work the ore of the Langsyne Mine at the "Paul's-process" mill of the company that owns the mine. About \$2,000 were spent to repair the mill and to extract ores. After a few days' running it was found that not enough was extracted to meet expenses, and both mill and mine are closed. The ore assays from \$20 to \$28 per ton, mostly gold.

The body of rich ore worked last year on the Last Chance Mine was exhausted, the ledge pinching out. After some further prospecting, the mine was abandoned.

No permanent work was done on the Tallulah Mine during the year. About five tons of ore were extracted, on a contract obtained from the company, the parties finding little encouragement to go on.

The Auburn, Samaritan, and other mines have been worked at intervals and prospected by the discoverers. Several small lots of ore have been thus extracted and shipped for reduction.

The Thacker and Goodrich mines have been prospected by a small force of men. The Goodrich was discovered last spring, near the Thacker, by the owners of the latter. Very soon after the discovery, steps were taken to erect a 10-stamp mill, about half a mile from these mines. The mill came from Chicago and was put up in the early fall. It is a steam-mill, with one pan. Gold is amalgamated in the battery. The ores of these two mines carry mostly gold, and are of low grade, though very rich specimens are found in both mines.

Central district.—The Golden Age Mill and the mine connected with it were sold at sheriff's sale in January, 1875, to James Gould, of Mill City. The mill has been idle during the year.

A tunnel drive at the Dutchman Mine, to reach the ledge about 225 feet below the outcrop, was completed at the end of the year.

Small quantities of ore have been extracted, and after close assorting, shipped for reduction from the Little Bell, Railroad, and Marietta mines. The old Fifty-six Mine (one of the oldest in the county, located first in 1856) has been relocated this year and worked by four men since last October. It is a copper-ledge, bearing silver. The ore extracted has been shipped to San Francisco for sale.

Humboldt district.—In October, 1875, two or three good "strikes" are reported to have been made in some of the old locations of the district. These consist, so far as known at the present time, of small bodies of ore extremely rich in free gold. This has created some talk and excitement in the vicinity.

Rabbit Hole district sulphur-mines.—In March, 1875, a sulphur-deposit was located by McWorthey, of Oakland, Cal., who obtained the knowledge of its locality through an Indian. The mine is situated about 40 miles northwest of the Humboldt House, on the Central Pacific Railroad, on the foot-hills of the range of mountains east of Quin's River Sink. These foot-hills consist of table-lands, which terminate abruptly on the valley of the sink, and are cut abruptly in places by the water-courses coming from the higher hills, leaving crumbling banks of soil and rocks. It is in one of these banks that the sulphur-bed was

discovered by the Indian, who reported the fact to many without arousing special interest. But the rise in the price of sulphur, due to the greater consumption of it in the manufacture of sulphuric acid on the coast, finally led to the location of the mine. The article proved pure and easily extracted. It occurs in irregular masses, sometimes one to two feet thick, and of pure quality, and again thinning out and getting mixed up with a light-colored fibrous magnesia-deposit, in close proximity to a deposit of lime-sinter, such as commonly occurs in the vicinity of hot springs in this country.

Shortly after this another deposit was located, about a mile from the first, by a cattle-man living on the Humboldt River, who previously knew of its existence. This location has been sold to the Humboldt Sulphur Company of Carson City, Nev. The best of the ore is taken out, transported to the Humboldt House, and thence by rail to Carson City, where it is used in the manufacture of sulphuric acid. The place where this mine is located is called Inferno. Beautiful crystals of sulphur are found in these mines. Much of the sulphur in the second mine being mixed with foreign matters, steps have been taken to melt it on the spot.

Star district.—The Sheba Mine has been worked steadily with a small force of men, taking out small quantities of ore. The shaft sunk on the outside of the old works and on the north side of the cañon, to reach the ledge found in the inside works, at the lowest level, has reached the depth of 80 feet. Hoisting-works have been placed over it. The motive-power is taken from the creek running in the cañon. The power is imparted to the machinery by a hurdy-gurdy wheel, receiving the water through a pipe over 300 feet long with a half-inch orifice. The administration of the mine has changed, John C. Fall having sold his interest.

The De Soto Mine was worked only about six weeks during the year.

The Krom Concentrating Works were run only a short time during the summer, to concentrate the second-class ore taken out of the Sheba and De Soto mines. This amounted to 343 tons of Sheba and 52½ tons of De Soto ore. The concentrator could not be run in the winter, as no provision is made to dry the ore, which, when moist, will pack in the rollers, and also fail to be separated in the air-currents of the concentrator.

WHITE PINE COUNTY.

The sudden death of my former agent for this county, Mr. A. J. Brown, of Treasure City, having deprived me of the source of information on which I had been accustomed to rely, I am indebted to General A. Cadwalader, of Hamilton, for the notes on which the following account is principally founded.

White Pine County contains at present about 8,000 square miles. It extends from the one hundred and fourteenth meridian, separating it from Utah Territory on the east, to Eureka County on the west, 100 miles, and from Elko County on the north to Lincoln and Nye on the south, with a width of 80 miles. Its topography is striking. Five great mountain-ranges course through it, springing from the Humboldt Basin, and, running south toward the Colorado, lose themselves in depressed volcanic hills, with the exception of the White Pine range, which, under the names of the Humboldt, White Pine, the Vegas or Charleston, and the Providence, continues its course with two interruptions, subsiding only in the basin of the Mohave. Valleys lie between these ranges of an area quite equal, if not even a little larger, than that of the mountains. The average elevation of these valleys is about 5,000 feet above

the sea, while the mountains acquire a maximum height of 11,000 to 12,000 feet. The rocks constituting these mountains are mostly of Devonian and Carboniferous age, having been elevated in the latter, and here and there retaining on their crest and sides rocks of that system. At intervals the Devonian rocks are intruded upon by traps, porphyries, and granites, but otherwise they present, in nearly all cases, a bed of magnesian limestone 600 to 800 feet in thickness; a black clay shale from 100 to 300 feet thick, and a quartzite, the bottom of which has as yet not been reached at 1,300 feet. These are all metaliferous, while the Carboniferous rocks that skirt them are barren of precious metals.

The first range at the west is the Diamond, and following in order eastward, and strictly parallel, are the White Pine, Egan, Schell Creek, and Snake. Huntington Valley interposes between the Diamond and the White Pine ranges, Steptoe between the Egan and the Schell Creek, and Spring Valley between the Schell Creek and the Snake. The Pancake, the Mokomoke, and the Antelope are intervening ranges of less importance and apparently more recent birth. They are unproductive as yet in minerals, with the exception of the first-named, which is now exploited for coal with most favorable indications. It is a low range, some 80 miles long, between the Diamond and the White Pine, and the period to which it belongs is probably the Carboniferous. Twenty-six mining-districts are distributed irregularly over the county, occupying unconnectedly the various mountain-ranges; and though silver is the principal valuable metal in all, each has its specific claim for consideration. White Pine, in its Treasure Hill chloride-ores, has no rival. Robinson takes rank for its vast exhibition of its copper, Ruby Hill for its antimonial-silver ores, Cherry Creek for its auriferous ores in connection with silver, while Muncey Creek and Hunter promise in the future for much silver-lead. Pinto, Diamond, and Newark districts, in the Diamond range, have failed to realize the expectations of their operators, and hence are in a depressed condition. Cave, Bald Mountain, and White Pine are in the White Pine range. The two former are but little known and are uninhabited.

White Pine district, the theater of unexampled excitement in 1868-'69, has since shrunk in public estimation as much below par as the "fever" had raised it above. The failure of the rude efforts in smelting at an early period condemned a valuable portion of the district to idleness, while another kind of valuable ores (copper-silver) were not utilized, because the metallurgists of the district, apparently unfamiliar with such ores and the proper method of reducing them, dreaded to undertake the problem. Mr. Quann, the proprietor of a patent process for this purpose, has recently made an unsuccessful essay in this direction, first roasting the sulphureted ores, and then melting in a reverberatory with a blast (supplied through a tuyere to the ash-pit) and a tank for condensing fumes. The resulting bullion was an alloy containing 48 per cent. of copper and 34 per cent. of lead, and worth in silver about \$150 per ton. For this product there was no sale.

The error of this proceeding is manifest. Instead of roasting, the inventor should have added sulphur in some form, (if enough was not already present in the ores,) in order to separate, in the form of argentiferous-copper matte, *all* the copper from the lead. This matte would be saleable, as would be also the lead, in which the greater part of the silver would be collected. Or, the silver might be profitably extracted by leaching from the argentiferous matte on the spot. The argentifer-

ous copper ores of White Pine need no new process, but an intelligent application of old and well-known ones.

The Rothschild blast-furnace (lead-smelting) has been run during the autumn with a degree of success which will probably stimulate operations in this direction.

The chloride-ores have participated in the neglect resulting from general industrial paralysis. With the exception of the Eberhardt and Aurora, few claims have been worked to any extent, most holders having contented themselves with doing the "assessment-work" and in many cases securing patents for their ground. The great Aurora vein or channel has been in *bonanza* this summer, in the Eberhardt and Aurora claim, yielding monthly some \$100,000. This claim is only 1,400 feet of a belt a mile and a half long and 100 feet wide, which has been penetrated not more than 400 feet in depth. It seems not unreasonable to hope for similar developments at other points and at greater depths. A tunnel to cut this and other ore-channels at a depth of 1,200 feet is now projected, and as it will cut the other two formations, it will furnish, if it should be carried through, an interesting and valuable section of Treasure Hill, on that line.

Robinson, San Francisco, Hendry, Hunter, Egan, and Cherry Creek districts are in the Egan range. Robinson is a wide zone, traversed by oft-recurring belts of silver, copper, and lead ores. Its rock-formation is somewhat complicated, containing, as it does, limestone, porphyry, granite, and diorite at intervals. The district furnishes no free-milling ore, but its smelting-ores are abundant and of fair grade. Aside from its unusual facilities of wood and water, the most notable peculiarity of Robinson district is its large copper-lodes, which abound in silicates, oxides, and sulphides.

The *San Francisco district*, north of Robinson, and separated from it by Hercules Gap, contains some undeveloped silver-lead mines of fair value.

Hendry district, near Perly's ranch, is as yet unwrought, but on the opposite side of the mountain, *Hunter district* has exhibited in the Arizona, the Nebraska, and the Hunter mines some good silver-lead ores.

Egan district, bisected by a beautiful stream of water, contains the Gilligan and some other mines, belonging to the San José Company, which General Rosecrans, the superintendent, is now developing by means of a tunnel driven with a Burleigh drill. A 20 stamp and a 4-stamp mill are idle, awaiting the results of this exploration.

Cherry Creek district, in a flexure of the mountain north of Egan Creek, gives promise in the Geneva, Tea-cup, Exchequer, Pacific, and Star mines of becoming productive. Here the three Devonian strata above mentioned are fully exposed, and it would appear that the quartzite is more abundant in silver than the others.

Ward district, the latest formed, is noted as the locality of the Paymaster Mine. It is twenty miles south of Robinson, on the east side of the Egan range, and well situated for exploitation.

In the Schell Creek range the *Cooper, Nevada, Piermont, Muncey Creek, Ruby Hill, Schell Creek, and Taylor districts* are located. With the exception of Taylor, they all show a state of industrial depression, ascribed to the lack of both capital and enterprise, yet the ore-deposits exhibited indications, in many cases, of remarkable promise.

Shoshone, Snake, Kern, Sacramento, and Antelope districts are in the Snake range, and being at present likewise neglected, call for no special comment at this time. It may be remarked that Sacramento district furnished gold to its early prospectors, and that Kern district is located

in a cross course on the great mountain range, of feldspathic granite, which dislocates the limestone formation.

White Pine County contains five smelting-furnaces, (blast,) four of which have been operated this season. Twenty-four quartz-mills have been erected, six of which have been removed, three destroyed by fire, and fifteen are now in existence, containing 242 stamps, not sufficient to manipulate the ores if the present depression should give way to a renewed enterprise commensurate with the intrinsic worth of the mines. The Eberhardt and Aurora is the only mine steadily worked; some few of the others are only worked periodically. According to the assessor's report, the returns for the four quarters of 1875 aggregate* 15,791,286 tons, yielding \$374,215.06, this being an improvement on last year, but falling far short of the early production of the county.

Some 11,000 claims have been located in White Pine district alone, thousands of which have been undisturbed, save by "assessment-work," while the great White Pine Mountain, 11,000 feet high, 12 miles in length, and abounding in mineral-lodes, being outside of the chloride range, has been left almost wholly virgin ground. Its western base exhibits the granite and shales that underlie the limestone, and the presence of gold is an ordinary feature of its southern veins. The great north and south deposits concur with the strike of the mountain, and these are intersected by numberless east and west veins, which may hereafter furnish convenient ground for drift-adits to intersect the meridional zones, 4,000 feet below the summit. The rich ores of the Trench and Caroline Mines have yielded from \$200 to \$600 per ton, by roasting in a Stetefeldt furnace and subsequent amalgamation, and the presumption is that these are not solitary and abnormal mines.

Information received from Mr. Cadwalader at the end of the year is to the following effect:

Within the past week a discovery has been made in the Eberhardt and Aurora claim that has produced much excitement in the community. In driving some 250 feet north of the current workings, and some 80 feet deeper, ore has been struck that resembles that of the first and famous Eberhardt chamber. It is a rich, soft chloride, yielding by assay of selected samples up to \$9,000, average uncertain, probably \$200 or \$300. Should it develop as anticipated, it will give a new impulse to the camp, particularly by encouraging deeper explorations.

The Paymaster Mine, in Ward district, referred to above, from its magnitude and the value of its ores, is entitled to a special attention. It is situated close to a belt of partly altered granite that has broken through the limestone formation. The vein has a width of 30 feet, 12 feet of which is pay-rock, containing argentiferous-lead and copper ores in the shape of argentite, freieslebenite, chalcocite, cerussite, and occasionally galenite. The mine is now owned by the Martin White Company, of San Francisco, and is exploited with much energy, the best ores being exported to San Francisco, while the main body is smelted at the Canton furnace at Robinson. Reduction-works will be erected next season, provided the present favorable aspects are maintained.

Within a recent period the Martin White Company, attracted by the fertility of the mines in the Taylor district, and by their proximity to Ward, (being across the valley in the Schell Creek range,) have purchased for \$14,000 a series of mines belonging to Taylor & Co., and propose to operate them in connection with the Paymaster. The value of the ores is high in silver, and copper is prominent.

* Details are given elsewhere in this report.—R. W. R.

Lake district, due west of Ward, and on the opposite side of the Egan range, high up the mountain, exhibits a 50-foot quartz-vein, carrying disseminated stephanite. The work done so far is insufficient to permit its value to be estimated. Its ores are rich, and should masses be found in proportion to the size of the lode, the hopes of its many locators will be realized.

The Snake range, the most eastern in the county and State, has been little prospected, by reason of its isolation and ruggedness, (two summits rising 11,000 and 12,000 feet, respectively,) and the reported numbers of rattlesnakes which infest it; otherwise, it is to be presumed, from the occurrence of igneous rocks and the great diversity of others, that it could contribute its quota to the wealth of Eastern Nevada. In timber and water it far surpasses the neighboring ranges, and it even contains here and there a lake to give variety to its scenery.

Though the product of White Pine County for 1875 is less than a million, it has this encouraging feature, that it exceeds that of either of the past four years, and to judge from present indications, the coming year may give a large increase in bulk and value of ore. The chloride belt that crosses Treasure Hill from the southeast to the northwest, though not of great width, has a length of nearly five miles, which contains many veins of "free ore," that will now be attacked with renewed vigor, and (independent of the Aurora, the chief vein) will produce largely. Where the natural chloridization is complete, the reduction of the ores is readily effected up to 90 or 92 per cent. of the pulp-assay. The average yield of Treasure Hill by amalgamation is 80 to 85 per cent. of the assay on all over a fair value. The last thirty-six days' run of the Eberhardt and Aurora consumed 1,052 tons, containing, by pulp-assay, \$123,620, and yielding 81 per cent. The mining cost per ton is very difficult to estimate, as a large amount of dead-work was connected with the regular extraction of ore; but, to judge from the facility of reduction, the freedom from extraneous expenses of pumping and timbering, the expense of mining will compare favorably with any other locality on the Pacific slope.

The assessor's report of the bullion product for 1875 shows the following aggregates:

	Tons.	Pounds.	Gross yield.
First quarter	2,338	589	\$96,690 00
Second quarter	4,828	535	284,876 77
Third quarter	4,031	166	218,300 00
Fourth quarter	4,502	1,840	263,968 54
	15,750	1,130	863,835 31

It will be seen that the returns of the county assessor vary by about 40 tons and \$10,000 from those of the State controller, a slight discrepancy which I am unable to explain.

LINCOLN COUNTY.

Nothing of importance calling for extended comment has taken place in this county. The only work of note has been done in Ely district, and this has so far not led to the desired results.

Ely district.—The Raymond and Ely Mine only has produced a fair amount of bullion, and the yield of this mine even is not to be compared with the production of former years. The Meadow Valley, considering the extent and former reparation of the property, has produced an insignificant amount of bullion, and of the other mines in the district none has come forward to assume a place of importance.

Much trouble has been encountered in the Raymond and Ely on account

of water, which could not be overpowered, even by the heavy machinery erected almost a year ago for that purpose, and started in May. Explorations below the water-line could only be carried 61 feet deeper than before. It is hoped that, when the Meadow Valley Company has finished the erection of its pump, now in progress, the water can be permanently mastered. The Meadow Valley Mine has shown no new discoveries, though a very large amount of prospecting has been done. To Mr. H. H. Day, superintendent of the Meadow Valley Company, I am indebted for the following important facts in regard to the Ely district:

The total shipments, which have been obtained by Mr. Day from the books of the Meadow Valley and Raymond and Ely Companies, and from those of Wells, Fargo & Co.'s Express, have been—

Fine bullion	\$999, 873
Base bullion	19, 800
Base ore	30, 500
	1, 050, 173

Of this \$738,305.97 was produced by the Raymond and Ely, \$82,168.44 from the Meadow Valley, and \$229,698.59 from all other mines of the district.

The total depth of the Raymond and Ely shaft at the end of the year was 1,275 feet. Sinking had been suspended during the three last months of the year. The bottom of the shaft was in hard quartzite.

Mr. D. H. Tyrrell, superintendent of the Raymond and Ely, reports the detailed yield of the mine during 1875 as follows:

Tons ore extracted	13, 107
Tons ore reduced	12, 593
Tons tailings reduced	13, 681
Average yield, tailings	\$5. 76
Average yield, ore	\$52. 36
Average percentage, tailings	24 6
Average percentage, ores	63. 8

TOTAL BULLION PRODUCT.

Ores worked	\$659, 471. 11
Tailings worked	78, 793. 41
35 tons base ore sold, net	5, 943. 79

Total yield *744, 208. 31

Mr. Tyrrell's report to the president and trustees at the end of the year contains the following detailed information in regard to the company's business:

During the year just closed there has been extracted from the mine 13,544,444 tons of ore, the greater portion of which was taken from the western portion of the company's ground. Previous to the commencement of the year the eastern portion of the company's ground had been prospected to the water-level and proved comparatively barren along the water line; and the new and powerful pumping-machinery which was erected in the early part of the year has proved inadequate to the requirements of our deep workings. Consequently, but little progress has been made in exploring the mine below the water-level. Several ineffectual attempts have been made to continue the main shaft downward; but the pumps not having sufficient capacity to remove the water, the work was discontinued, and, for the past four months, the pump has been running up to its full capacity, and thus far has failed to remove the water, so that sinking could be resumed. Hence our prospect-operations for the past year have been confined exclusively to the western portion of the company's ground above the water-level.

The most productive portion of that ground has been between the eighth and ninth

* It will be seen by comparing this statement with the secretary's report, that there are slight discrepancies, due, no doubt, to mere matters of book-keeping.—R. W. R.

level. To the west winze No. 2 there has been a continuous body of good milling-ore extending 400 feet in length, varying from twelve inches up to seven feet in width. This ore-shoot terminates about 20 feet to the west of winze No. 4, on the eighth level, at which point a cross-head makes in, dipping to the west on an angle of 45° , which cuts the vein entirely off, not even leaving a trace behind. The west drift on eighth level was continued on through the cross-head, and has penetrated the formation to the west of that point, a distance of 218 feet, and at present the face of this drift shows a mixture of talc and limestone, principally the latter, which is the mountain rock; and it is difficult to predict what will be disclosed to the west of this point. This drift is still being pushed ahead (it has now a total length of 1,921 feet) in hopes that the quartzite may raise to the west of the formation now being penetrated by this drift; but should the same formation continue, no satisfactory results will be obtained in this locality.

A prospect-drift was run south from the main west drift on the eighth level, at a point 1,132 feet west of the main shaft, and carried ahead a distance of 153 feet, at which point a stratum of ore 8 inches in width was disclosed, which was followed to the west a distance of 23 feet, at which point a cross-head made in the face of the drift, which cut the vein entirely off. Work was then discontinued in that direction, and a drift started east on the ore-streak, which was continued a distance of 108 feet; but 25 feet of this distance showed a little ore and the balance of the distance showed barren quartzite.

A winze was started and carried down on the ore-streak a distance of 125 feet to the ninth level; the entire distance sunk showed a continuous streak of ore varying from 8 to 10 inches in width.

The west drift on ninth level was continued up to and beyond the same cross-head found on the eighth level, where the same formation was encountered as shown on the level above. Not deeming it prudent to continue this drift, further work was discontinued at this point.

A cross-cut was also run south from the west drift on the ninth level, to intersect the south vein a distance of 154 feet, at which point a connection was made with the winze sunk from eighth level. At the point of connection the eastern limit of the south vein is defined by a cross-head which made in it at the bottom of the winze on the ninth level, and to the east of this cross-head no trace of the fissure has as yet been found. To the west of this cross-head the vein is followed westward a distance of 115 feet, at which point another cross head makes in which cuts the fissure off entirely; still the drift has continued on through the cross-head, and to the west of that point 60 feet, where the quartzite formation becomes very regular and the throw of the vein always being to the south, running westward when displaced by these cross-heads. We are at present engaged in running a cross-cut south from the end of this drift, which has now a length of 40 feet, for the purpose of determining whether the south vein continues to the west of this cross-head or dies out at that point.

Several winzes have been sunk from the ninth to the tenth level, along the line of the ledge. These explorations show the vein to be strong and well defined, but comparatively barren; but the trend of the ore-shoots being to the west, gives reason to hope that ore will be found in paying quantities to the west of this point.

The west drift on tenth level has been continued ahead until it now shows a length of 1,553 feet. The formation being penetrated is hard quartzite, with only a seam to point out the line of the fissure; but as the No. 3 winze, being carried down from ninth level, is coming down but a short distance ahead of the face of this drift, and is showing a strong, well-defined vein, with some promising indications of ore, we may expect to meet with a favorable change in the face of this drift very shortly.

A cross-cut was run south from west drift on tenth level, at a point 1,270 feet west of main shaft, and carried ahead 44 feet, at which point we found a seam or separation in the quartzite which proved to be the continuation of the south vein downward. A drift was carried to the west on this seam a distance of 73 feet. The entire distance showed the vein to be very small, and, at intervals along the line of the drift, a frosting of ore was found, adhering to the walls of the fissure.

A winze was started at a point 1,057 feet west of main shaft on tenth level and carried down a distance of 86 feet, at which point the influx of water was so great that it could not be removed with the appliances we had at our command. Hence, work was discontinued, and at present there is 12 feet of water in the bottom of winze.

The west drift on eleventh level has now a length of 1,104 feet. The face of drift shows a mixture of talc and quartzite with occasionally some small spots of very base ore. We were compelled to discontinue work in the face of this drift a few weeks ago in consequence of not having sufficient air to prosecute the work in connection with the raise which we are at present engaged in running up to connect with the bottom of winze sunk from tenth level. This raise has now a length of 78 feet, which leaves a distance of 28 feet to raise before the connection will be made with the bottom of winze. This connection, when completed, will furnish a good circulation of air, when the work on eleventh level can be prosecuted to advantage.

We are at present engaged in running a raise up from west drift on eighth level, at a

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point 1,520 feet west of main shaft, which has now a length of 80 feet. This raise is furnishing some very fine ore, but, so far, the ore-streak is very limited in extent; but as the raise is being carried up two hundred feet west of the Page & Panaca workings, and in a country entirely unexplored, it is reasonable to believe that our efforts in this locality will be rewarded by the development of some paying bodies of ore.

We are also engaged in extending the main drift on fourth level westward. At the point of commencement the fissure is strong and well-defined, and occasionally shows some promising indications of ore. The only bad feature that presents itself at this point is the hard, smooth foot-wall, which is regarded in this locality as an unfavorable indication of ore; but the ground being very changeable, this unfavorable feature may soon be displaced by more promising indications.

In consequence of the pumps not having sufficient capacity to remove the water, the Lightner shaft has only been extended downward 61 feet during the year, making its total depth 1,275 feet. The pump is working very satisfactorily and is gradually exhausting the water, and I believe we will be able to resume sinking in a few days.

The Burke and Creole Mines belonging to the company have been allowed to remain idle during the greater portion of the year. After a thorough examination of these mines, I decided to apportion them off on the different levels, and let contracts to individual prospectors, allowing them to extract ore from the old abandoned levels of these mines at their own expense and pay the company 40 per cent. of all ores extracted, and the other 60 per cent. to be worked at the company's mill, if desired; but, so far, no revenue has been derived from this source, as the explorations made by these parties on the different levels have proved unprofitable and disclosed but very little ore.

The company's 30-stamp mill at Bullionville is in good condition, and is being run up to its full capacity. There has been no expense incurred on this mill within the past year, except what has been necessary to keep it in repair. The parts that become worn out are replaced by duplicate castings, a supply of which we always have on hand at the mill. I anticipate no expense beyond ordinary wear and tear which can attach to it the coming year.

The company's 20-stamp mill has been idle the greater portion of the past year, having only run two months on tailings in the early part of the year. The battery at this mill is in good condition, but the pans will require new mullers, and the shafting will have to be lined up and the boxing babbitted before it will be in a condition to start up.

The Nevada Central Railroad, which has lately come into possession of the company, (several miles of which was badly damaged by a cloud-burst some twelve months ago,) has been repaired, and is now in good running order. It is being used to transport the ore to the company's mill. The road-bed is in good condition, and I anticipate but little more expense on it, except the repairs incident to running. But the rolling-stock on the road was in a very bad condition at the time it came into the possession of the company. The axles of the cars being of an inferior quality of iron, and it having become crystallized, it has given us considerable trouble and expense to keep the necessary amount of cars on the road to do the work; but we will soon have an entire new set of axles under the cars, when we will have but little trouble in keeping them in repair.

There is on hand at the mine and mills material and supplies, consisting of timber, wood, castings, quicksilver, chemicals, &c., to the amount of \$63,854.83, as per inventory of December 31, forwarded to your office.

RAYMOND & ELY MINING COMPANY.

Statement of ore and tailings worked during the year 1875.

Tailings, tons	13,681	
Bullion product		\$78,793 41
Average yield per ton	\$5.76	
Average percentage	24.4	
Ores, tons	12,592,688	
Bullion product		659,471 11
Average yield per ton	\$52.60	
Average percentage	63.4	
Total		738,264 52
Add sale of specimen ore at San Francisco office		41 45
Total		738,305 97

RAYMOND & ELY MINING COMPANY.

Statement showing the amount of ore produced, cost of extracting, &c., for year ending December 31, 1875.

Months.	Ore-summery.				Cost.				Total.				
	From what source.		Grand total.		Extraction.		Prospecting and dead work.			Inidental ex- penses.			
	Panaca Mine.		Burke and Creole Mine.		Labor.	Materials.	Labor.	Materials.					
	Tons.	Pounds.	Tons.	Pounds.									
On hand January 1, 1875.	153	1,050	35	100	170	1,150	84,000 00	91,000 00	83,542 50	82,650 83	814,461 20	81,426 85	\$58,101 38
January, 1875	145	1,000	100	300	145	1,000	4,000 00	1,000 00	7,154 75	1,652 78	12,218 70	1,508 97	58,537 20
February, 1875	100	700	100	300	100	700	4,000 00	1,000 00	12,218 00	5,985 14	14,110 76	1,013 44	58,987 34
March, 1875	363	2,541	363	2,541	363	2,541	6,000 00	1,200 00	13,681 00	5,675 71	4,830 37	1,538 82	59,914 00
April, 1875	643	4,501	643	4,501	643	4,501	8,250 00	5,000 00	21,319 50	13,005 67	.....	2,187 69	60,783 88
May, 1875	1,140	8,180	1,140	8,180	1,140	8,180	18,000 00	7,000 00	14,733 75	9,657 39	8,476 00	2,248 21	62,135 35
June, 1875	1,705	12,135	1,705	12,135	1,705	12,135	18,000 00	9,000 00	24,015 75	12,059 04	9,470 50	2,277 07	62,863 90
July, 1875	1,890	13,430	1,890	13,430	1,890	13,430	11,000 00	7,600 00	25,387 50	6,380 07	6,297 46	2,260 51	63,504 54
August, 1875	1,718	12,426	1,718	12,426	1,718	12,426	13,000 00	8,000 00	20,964 00	7,441 84	6,795 24	2,154 97	63,926 05
September, 1875	1,920	13,740	1,920	13,740	1,920	13,740	19,034 00	8,841 50	19,109 75	7,000 00	8,402 12	3,750 67	64,218 40
October, 1875	9,255	65,785	9,255	65,785	9,255	65,785	24,105 58	5,644 00	12,364 85	5,644 00	12,856 15	2,041 47	65,439 48
November, 1875	1,937	13,759	1,937	13,759	1,937	13,759	15,500 00	7,000 00	17,997 25	3,141 57	12,184 39	1,521 91	57,345 12
December, 1875	1,948	13,836	1,948	13,836	1,948	13,836	138,149 58	64,529 17	197,488 70	79,185 64	116,365 89	24,517 53	690,260 56
Total	13,509	97,600	35	100	13,714	476	.....	14 78	.....	20 18	.....	8 42	45 29
Average per ton ore extracted	.....	.....	.....	.....	513	1,616	.....	.....	.....	.....	.....	.....	.....
On hand, mill-dump	.....	.....	.....	.....	300	.....	.....	.....	.....	.....	.....	.....	.....
On hand, mine-dump	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	813	1,616	.....	.....	.....	.....	.....	.....	.....

Amount of ore worked at outside mill. (tons.) 60,700
1,335

200 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

RAYMOND & ELY MINING COMPANY.

Statement of bullion produced for account of the company for year ending December 31, 1875.

Months.	Number of bars.		Weight, Troy ozs.	Fineness.		Value per ounce.	Value.		
	From—	To—		Gold, 1,000.	Silver, 1,000.		Gold.	Silver.	Total.
January, 1875....	4,760	4,782	34,704.00	001.0	546	\$72 66	\$747 21	\$24,498 58	\$25,245 79
February, 1875....	4,783	4,800	27,107.50	000.4	674	87 17	312 26	23,635 13	23,947 39
March, 1875.....	4,801	4,815	23,680.00	000.4	665	88 02	304 87	20,572 13	20,877 00
April, 1875.....	4,816	4,821	10,328.00	001.0	672	84 05	227 18	8,496 05	8,723 23
May, 1875.....	4,822	4,842	32,760.00	001.3	785	10 13	911 73	21,273 33	34,188 26
June, 1875.....	4,843	4,907	111,145.50	001.4	729	97 33	3,083 57	95,363 96	98,447 53
July, 1875.....	4,908	4,958	82,326.50	001.6	776	104 77	2,797 50	83,465 09	86,262 59
August, 1875....	4,959	4,998	63,751.50	002.0	727	98 11	2,038 30	59,917 34	62,555 64
September, 1875.	4,999	5,042	67,657.50	001.0	743	103 37	4,225 01	63,042 42	69,267 43
October, 1875....	5,043	5,087	69,431.00	004.2	746	105 22	6,219 05	67,867 07	74,086 12
November, 1875..	5,088	5,147	90,948.50	003.8	694	97 58	7,144 79	81,612 41	88,757 22
December, 1875..	5,148	5,258	166,370.00	002.4	645	88 30	8,169 30	137,737 02	145,906 32
			770,209.00			95 85	36,783 77	701,480 75	738,264 52
Add amount produced from ore shipped to San Francisco.....									41 45
									738,206 97

The secretary's report contains the following :

A statement of the gross proceeds of bullion from the mines of the Raymond & Ely Mining Company, and the cost of production and reduction of the ores yielding the bullion, for the fiscal year ending December 31, 1875.

DR.

To mining department, viz :		
Labor in extracting ores.....	\$137,374 33	
Mining supplies.....	74,989 74	
Freight from San Francisco on supplies.....	4,997 85	
Incidental expenses.....	11,651 32	
Mine-salaries.....	12,444 41	
Total expenditures in extraction.....	241,447 65	
Deduct superintendent's inventory of supplies on hand at date.....	13,868 70	\$227,578 95
To milling department :		
Ore-transportation from mine to mills, (11 miles).....	34,073 14	
Chemicals, tools, and other supplies.....	153,183 38	
Freight from San Francisco on supplies.....	6,816 40	
Reduction-labor.....	63,740 94	
Repairs.....	3,163 00	
Incidental expenses.....	387 37	
Mill-salaries.....	7,310 00	
Total expenditures in reduction.....	268,674 23	
Deduct superintendent's inventory of supplies on hand at date.....	45,580 40	223,093 83
To miscellaneous accounts, viz :		
Discount on bullion for current year.....	73,529 28	
State of Nevada taxes on bullion.....	5,293 31	
Property-taxes.....	6,091 16	
Insurance premiums on mill-property.....	5,600 00	
Telegrams to and from company's works.....	420 85	
Bullion-freight.....	491 20	
Interest.....	8,522 42	
General expenses.....	10,483 83	
		110,432 05
Total cost of production and reduction.....	561,104 83	
Extraordinary expenses in exploration and dead-work.....	260,898 77	
		822,003 60

CR.

Bullion:

Proceeds of company's reduction-works at Bullionville, as per tabular statements of general superintendent and office-records for the fiscal year ending this date..... \$738,305 97

Miscellaneous returns:

Ore-sales	\$5,943 79	
Sales of mine-supplies	1,903 84	
Sales of mill-supplies	1,013 66	
Profit on machine-shop and foundry account sales. \$3,157 47		
Inventory	4,405 73	
		7,563 20
		16,424 40

Total receipts for the year.....	754,730 46
Excess of expenditures—	
In explorations and dead-work for current year.....	67,273 14

822,003 60

T. W. COLBURN,
Secretary.

SAN FRANCISCO, January 25, 1876.

SUMMARY.—*The Raymond & Ely Mining Company in account with its estate for the full corporate term ending December 31, 1875.*

DR.

Permanent investments.

In mine-properties:

\$971,548 87
61,079 37
3,064 80
3,501 52

For the fiscal term 1871-'74	\$1,039,194 56
For the fiscal year 1875	72,372 05

\$1,111,566 61

In construction of mining-works:

For the fiscal term 1871-'73	102,715 12
For the fiscal year 1875	31,610 24

134,325 36

In construction of reduction-works:

For the fiscal term 1871-'74	170,126 67
------------------------------------	------------

In mine-pump construction:

For the fiscal year 1874	\$199,831 70
For the fiscal year 1875	54,826 71

254,658 41

In Nevada Central Railroad property:

For the fiscal term 1873-'74	220,863 53
For the fiscal year 1875	34,385 50

255,249 03

Total permanent investments	1,925,926 28
-----------------------------------	--------------

Dividends.

Paid stock holders the fiscal years of 1871, '72, and '73	3,075,000 00
---	--------------

Total	5,000,926 28
-------------	--------------

Inventory of supplies at mine.....	\$13,868 70	
Inventory of supplies at mill	45,580 40	
Inventory of supplies at foundry.....	4,405 73	
Magnet Mining Company.....	10,677 05	
Hermes Mining Company.....	144 00	
D. M. Tyrrell, general superintendent, (current balance)	579 46	
Bullion in transitu	58,339 65	
Balance in bank.....	39,775 03	
		\$173,370 02
Grand total		5,174,296 30

CR.**Bullion product:**

For the fiscal years 1871, '72, '73, and '74	\$8,067,980 78
For the fiscal year 1875.....	738,305 97
Total	8,806,286 75

*Bullion cost-sheets deducted.***For the fiscal term 1871-'74:**

Production and reduction.....	\$3,492,555 02
-------------------------------	----------------

For the fiscal year 1875:

Production and reduction.....	561,104 83
Dead-work.....	260,898 77

Total 4,314 558 62

Less re-imbursed by sales of ores and supplies:

For the fiscal term 1871-'74.....	\$20,300 43
For the fiscal year 1875..	16,424 49
	36,724 92
	4,277 833 70

Total net profits of bullion-yield

Assessments:

Number one.....	
Number two	
Number three	
Number four	
Number five, (paid to date on account of \$90,000)	

Pioche Phoenix Mining Company.....

Total

*Current liabilities.—Exhibit***Superintendent's drafts unrepresented.....**

Grand total

CHAPTER III.

IDAHO.

The past year has not been a prosperous one for the mining-industry of this Territory.

The placer-mining interest has suffered again from a scarcity of water, and the failure of the Bank of California, together with the absconding of George M. Pinney, who had in his possession a large amount of money belonging to three of the Owyhee companies, dealt the Silver City mines a severe blow, from the effects of which they had not yet recovered at the close of the year. The failure of the South Mountain Consolidated Mining and Smelting Company brought operations in that camp almost to a dead stand-still. The Pittsburgh Company, by far the largest bullion producer in Rocky Bar, stopped work in August, and the Wide West in December. To counterbalance this we have only the increased activity in Atlanta and Banner districts, and the discovery of the new mines at Wagontown, Cañon Creek, and at Ruthburgh, in Heath district. Only the first of these, however, have produced bullion, and that in limited amount.

The bullion product of the Territory is placed by Mr. Valentine, of Wells, Fargo & Co., at \$1,554,902, divided as follows:

Gold bullion shipped by express.....	\$1, 163, 698
Gold bullion shipped by other means	116, 369
Silver bullion by express.....	116, 369
Ores and base bullion	44, 000
Total	1, 554, 902

This estimate of "base bullion and ores" is, however, too low, the ore shipments from Atlanta, and probably Wagontown also, having evidently been omitted. This, according to the best information I have, will swell the product to \$1,750,000 in round numbers.

Mr. A. Wolters, superintendent of the United States assay-office at Boise City, has again kindly visited the various mining-districts for me, and his notes have served me as the main basis for the following report.

ADA COUNTY.

In October, 1874, a party of men returning from a prospecting expedition, when riding over the summit of Omega Mountain, near the Snake River, found a piece of pure galena-ore, and a little prospecting led to the discovery of a large and well-defined galena-vein. Owing to the lateness of the season and the lack of sufficient tools and provisions, but little work was done that fall. Enough, however, had been shown to encourage further work in the spring, and to create a mining excitement on a small scale among the people living in the surrounding settlements. In the spring of 1875 work was resumed, and followed by the discovery of many apparently very valuable lodes. June 30 a new mining-district was organized, and called Heath district, the mines being

christened the Snake River mines. By-laws were adopted, and Frank J. Parker was elected recorder.

Heath district is located in the northern corner of the county, and bounded by Pine Creek, Snake River, and a branch of the Weiser. The silver-mines are about 6 miles from the Snake River, 20 miles from the settlements of the Upper Weiser, and 120 miles from Boise City. They are found on the north side of a small creek, tributary to Brownlee Creek, which empties into the Snake River close to the old Brownlee trail, connecting Eastern Oregon and Idaho. The facilities for communication with the mines are at present not good, there being only a trail from the Weiser country, which leads over a rough and rocky region, up and down steep hills, and through narrow basalt cañons; but Messrs. West & Gaylord, who have already re-opened the old Brownlee ferry across Snake River, are now building a graded road 6 miles long to the mines, and propose to construct, also, a wagon-road from there to Salubria, on the Upper Weiser, which would give good communication either way. Fifteen to eighteen miles northwest are the Connor Creek (Oregon) mines and mill, affording the nearest market for ore, to which probably all the first-class ore will be taken for reduction until reduction-works are erected in the new district. The cost of packing the ore to the Connor Creek works on donkeys will be about \$15 per ton.

Nearly all the gulches in the immediate vicinity of the mines contain small streamlets, which empty into Pine or Brownlee Creek, either of which would furnish an ample amount of water for steam-milling operations all the year round, but not enough to furnish good water-power. Pine and fir timber are abundant within easy reach of the mines, and the hill-sides are covered with a luxuriant growth of the finest bunch-grass, affording fine pasture for cattle and horses. Game of every description and fish are very plentiful, and grain, vegetables, &c., are raised in large quantities in the Weiser Valley, where, moreover, a flour-mill is in operation.

Like several other very promising mining-camps in Idaho, Heath district will have to suffer to some extent from the disadvantage of its out-of-the-way location, and the fact that all the owners of property there are workmen without capital, and therefore unable to either properly develop their lodes or build works, however small, for the treatment of their ore. That there is intrinsic value and merit in some of the lodes has been already established beyond doubt, and with better facilities of transportation and good reduction-works the camp might become a very flourishing and productive one.

Development of the first-discovered galena-vein proved it to be 8 feet in width, with 12 to 18 inches of very pure galena on the foot-wall, which assays from 65 to 70 per cent. of lead and \$15 to \$20 in gold and silver. Besides this galena-vein, there are several streaks of carbonates; and in all about 100 tons of ore have so far been taken out. The lode runs northeast and southwest, and dips northwest.

Other galena-bearing veins have been discovered near the first, presenting the same characteristics; but they have not been developed, as the attention of the prospectors was drawn in another direction, when Joseph Ruth, an experienced Nevada miner, discovered a few miles away a very fine silver-lode, called by him the Belmont. He and Heath, the discoverer of the galena-lode, located 3,000 feet on this new lode; other parties taking up 900 feet on each side, as North and South Belmont extensions. The vein runs northeast and southwest, dipping slightly northwest, is 6 feet wide, and carries a pay-streak, varying in

width from 12 to 24 inches on the foot-wall. The ore is quartz, impregnated with native silver, horn-silver and silver-glance, and a small amount of carbonate of lead. The shaft is down 30 feet, and the dump contains over 100 tons of good ore, which will probably yield several hundred dollars per ton. Two assays of the best ore gave the following result:

	Per ton.
No. I. Gold, trace; silver.....	\$796 43
No. II. Gold, trace; silver.....	1,303 04

The character of the ore at the present depth makes it peculiarly adapted to treatment by raw amalgamation.

Not far from the Belmont, and parallel to it, is the Greenhorn lode, discovered and owned by the same parties, and having the same course, dip, and quality of ore. The shaft is down 30 feet; ore on hand, about 100 tons.

Half a mile above the Greenhorn is the Silver-lining lode, discovered this fall by Frank J. Parker. It is 40 feet wide on the surface, and has a shaft 15 feet deep. During this winter Mr. Parker will sink it 75 feet deeper, and then cross-cut to the other wall. There is a small amount of ore on hand, which compares well with the best in the camp.

The Alpha lode, discovered and owned by the same party, is believed to be an extension of the Belmont. Considerable work has been done at the surface. The ore, unlike that of the other lodes, carries gold. A good prospect is obtained by panning; but it can be seen by the color that the gold contains probably over one-half silver.

Several other lodes have been discovered in the immediate vicinity, but they will not be developed before spring. The surface indications justify the belief that they will prove not inferior to the above.

Two miles east of the belt of silver-lodes is the Picayune lode, owned by Parker, Bridgeman, Hoover & Co.

It is a promising copper-lode 20 feet wide, the ore being chiefly copper-glance and bornite, with small amounts of carbonate, the best yielding 60 per cent. of copper and about \$30 in gold and silver. Work on this lode is now prosecuted by a tunnel, and some ore has been found which is said to have assayed as high as \$174 per ton in gold.

On the next ridge east of this lode is found a large deposit of iron-ore, large boulders of excellent hematite covering the ground for a quarter of a mile.

Forty miles north, on the range dividing the Weiser and Salmon Rivers, is another copper-lode, called the Blue Cloud. In the bottom of the shaft, which is 60 feet deep, the lode is 23 feet wide, and it is claimed that assays have been obtained from the ore yielding 80 per cent. copper and from \$700 to \$1,800 in gold to the ton. If such be the case, the ore must principally consist of red-copper ore, (cuprite,) or native copper, and the vein may become very valuable in the future; but the correctness of the assays is open to doubt. The lode has been abandoned for the last two years.

A ledge has also been found in this district which produces a very fine quality of mica. The largest sheets seen by Mr. Wolters were about 3 by 4 inches, but the owners contend that they can furnish larger ones.

On the Payette some work has been done in developing a coal-deposit, and it is reported that very fine coal has been obtained, burning well in a stove, and also suitable for the blacksmith's forge.

There are undoubtedly large deposits of fine lignite all along the foot-hills, from a point 50 miles southeast of Boise City to the Snake River.

Pieces of "float-coal" found in different places have been tried at the Boise assay-office. They burn with a long yellow flame, leave 3.5 per cent. of ash, and contain no sulphur.

ALTURAS COUNTY.

In *Red Warrior district* some work has been done in the Wide West Mine, though, owing probably to the financial embarrassment of the owner, it has been rather spasmodic in character. In following the third level west a cross-fissure was encountered which slightly dislocated the older vein, and proved entirely barren of the precious metals. Work was stopped when the quartz proved valueless, and nothing was done to ascertain the character and extent of the disturbance, which evidently had taken place there. A shaft was then sunk 315 feet from the mouth of the tunnel to a depth of 75 feet, but at 25 feet the vein was lost, which also remained unnoticed until a fortunate "slide" occurred, leaving a fine body of ore exposed on the hanging-wall. On this vein the fourth level was run west. At a distance corresponding with that in the third level the cross-vein was struck again, but the regular vein was found beyond the crossing close to the place of dislocation. This level is now in 150 feet, and shows from 1 to 2 feet of ore, which yields in the mill from \$25 to \$30 per ton. Beyond the cross-fissure the lode has never been worked in the upper levels, and there is consequently an extensive piece of virgin ground, about 300 feet high, left untouched, which, after being properly opened, will keep the mill running steadily for a long time.

The large amount of water made by the shaft and the fourth level is hoisted by a horse-whim put up in a chamber excavated for that purpose in the third level. This forms a very serious obstacle to profitable mining, and it is much to be regretted that the owner's present financial difficulties have prevented so far the erection of good substantial hoisting-works, which will be necessary before long to reduce the expenses of mining.

It was the intention to prosecute work vigorously, but late in December the batteries broke down, and as Mr. Hussey was dependent on his mill to pay the hands, work had to be suspended and will not be resumed before next summer.

The avalanche is worked by Thomas & Holman and a large amount of \$50 ore is taken out. The shaft is now down 60 feet below the 100-foot level, and the owners are running a cross-cut tunnel 400 feet long to tap the lode at the bottom of the shaft. They are now in 250 feet, and if they find the lode as good below as it is in the upper workings, they will have a large amount of first-class ore in sight after their levels have been run.

The Burnt Pilot, situated a short distance below the Wide West, was relocated, and is now steadily worked by Hicks, Porter & Roary. Their shaft is 40 feet deep and shows a 2-foot vein of ore which will probably mill \$50 per ton. They expect to have about 100 tons on the dump when spring opens.

The Governor Bennett was located and worked by Frank Strauss, 18 tons of ore having been taken out, which yielded at the rate of \$39 per ton.

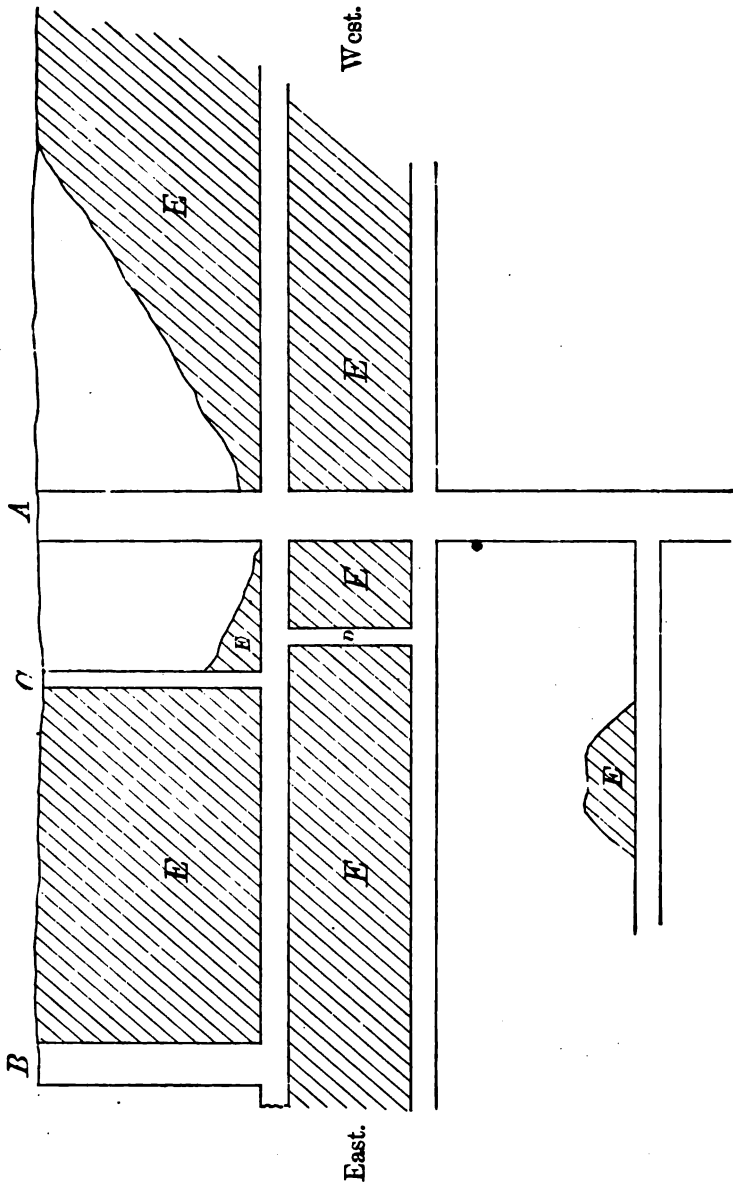
The Hard-up has been worked by Strauss & Van Schack, and a lot of ore taken out, for which the owners were offered \$60 per ton on the dump. The Bearskin, worked by Temple Brothers, and the John

Schaeffer, worked by Frank Shaeffer, produce some good ore, as also does Wakefield's Tenino lode.

The property formerly owned by C. Jacobs, of Boise City, including a 20-stamp mill, the Victor, New York, and other lodes, has been sold to San Francisco parties, who have not yet done anything with it, but will probably commence active operations next spring.

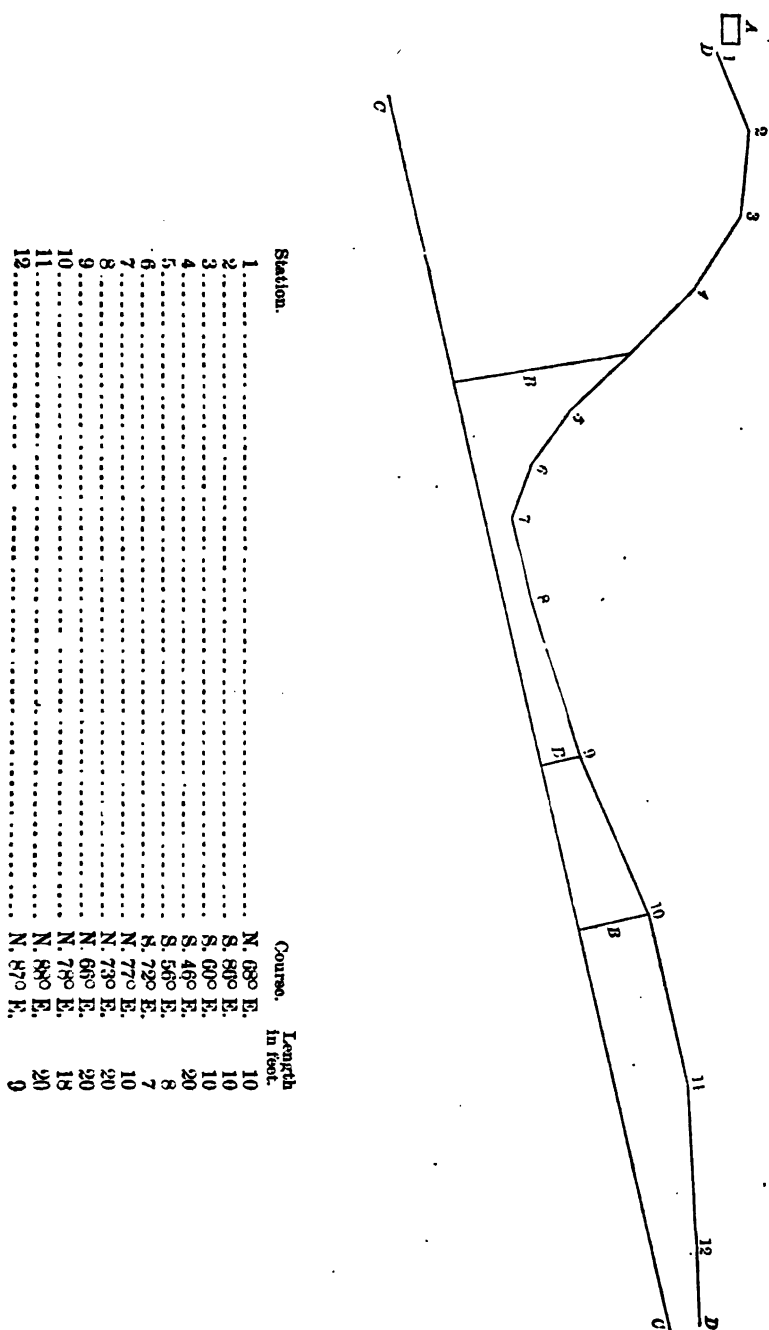
Rocky Bar district.—The Ada Ellmore was steadily worked until the latter part of September, when operations were suspended, for what reason I have been unable to ascertain. If it were because the work was not profitable, the mine ought not to be blamed, for there is hardly a better gold-mine in the Territory than the Ada Ellmore. But the proprietors seem to have expected the mine to pay its own way from the grass-roots down, and to furnish from its own profits the pumping, hoisting, and milling facilities which are essential to its profits. Some judicious advances of capital in such cases would save much time, loss, and discouragement.

During this year the shaft of the Ada Ellmore has been extended 75 feet deeper, and a cross-cut has been run for the vein from the bottom. A vein was struck which was supposed to be the Ellmore proper, and was followed for about 160 feet, when the real lode was struck, proving the first one to be only a branch or offshoot. Two cross-cuts were then run about 50 feet apart, and both developed a strong body of ore from 1 to 2 feet wide. The present state of development is shown by the following diagram.



A, main shaft; B, Waddingham shaft; C, Reeser shaft; D, air-connection; E E ground stoped out. Levels: 1st, 95 feet below surface, extended 210 feet east, and 150 feet west of shaft; 2d, 50 feet below 1st, 206 feet east and 120 feet west; 3d, 75 feet below 2d, 146 feet west. In the blank space above the first level small pockets of ore have been found, but not in sufficient quantity to pay for working.

Below is a sketch showing survey of the third level run on the branch vein.



A, shaft; B B, cross-cuts; C C, Ada Ellmore main vein; D D, branch vein. Course of main vein, N. 69° E.; courses of branch vein:

The ore obtained from the mine was worked in the old Waddingham mill, which the company leased from Jacob Reeser. It produced between \$17,000 and \$18,000.

Jacob Reeser has been working the Wahl Brothers' property under a lease, which expires in April, 1876. On the Ada Ellmore he has done a good deal of work, but, having no pump or good hoisting-works, was driven out by the water as soon as the Pittsburgh Company stopped work. The Confederate Star has been worked steadily by him, and a large amount of ore has been extracted, which yields about \$50 per ton. One hundred tons are now on hand.

Late in the fall the Wahl Brothers' property, consisting of 1,200 feet in the Ellmore, 660 (undivided) feet in the Confederate Star, small amounts in several other lodes, a 10-stamp mill considerably worn known as the Waddingham Mill, and complete new machinery for a 20-stamp mill, including an 80-horse-power engine, was sold to T. W. Rollins for the small sum of \$20,000. This property ranks among the best in Rocky Bar, but the former proprietors did not work it. During the five years it was in their possession, their only action was to give Mr. Reeser a lease for two years; and the result of his work clearly shows that by the expenditure of some money in putting the mines in proper shape for working a much larger sum could have been obtained as clear profit than was received from the sale of the whole property. While their ground in the Ellmore was not developed, the work done by the Pittsburgh Company on the adjoining claim showed that the rich ore-body pitches directly into the Wahl Brothers' ground, and thus established the value of this property beyond doubt. The Confederate Star enjoyed already in early times a high reputation, having produced about \$250,000. There is a large amount of ore now left in the old levels, and Mr. Reeser demonstrated the continuity of the ore-body by sinking 50 feet and running levels both ways.

A lawsuit between Wahl Brothers and the Valley Gold-Mining Company involving the identity of the Confederate Star and the Golden Star, (the latter being owned and worked by the company,) was decided this summer in favor of the former, which leaves the Valley Company without a mine; but it is probable that the purchase above mentioned was made in the interest of the principal stockholder of that company.

Mr. A. Kramer crushed 30 tons of ore from the Sierra lode, which yielded \$25 per ton.

The Idaho is worked under a lease by Fitzwater and Parlin, looks well, and turns out some high-grade ore.

The Vishnu is also worked under lease, by Parsons, Myers, Hall & Anderson. Their level is in 100 feet west and 100 feet east, and 100 tons of good ore are on hand.

The Idaho Bonanza, owned by Dilley & Johnson, has a shaft 80 feet deep, and a cross-cut tunnel has been run a distance of 100 feet. A contract has been given to extend this tunnel 100 feet farther and raise an air-shaft, which will open a large amount of ground. The lode carries from one to two feet of ore, which yields about \$90 per ton in the stamp-mill.

In Hardscrabble, only two men are at work on Pfeiffer & Company's lodes. Last winter a shaft was sunk 100 feet on the Poorman, developing a body of ore along the whole distance from 8 to 16 inches wide, that will probably mill not less than \$40 to \$50 per ton. This winter a level was run from the bottom of the shaft, and some exceedingly rich ore was struck in it.

Some drifting has also been done on the General Grant, exposing an

ore-vein over a foot wide, worth, according to tests made, from \$50 to \$100 per ton.

The placer-claims were worked with seven hands. They cleared the owners \$60 per day over all expenses from May 1 to November 15, and there is ground enough covered by the present ditches to last for several years more.

Atlanta district.—More activity has prevailed in this camp during the last year than for a long time before, and the results so far obtained are of an exceedingly favorable character.

The principal work has been done on the Atlanta lode. Mr. Lantis has been working the Monarch Company's ground steadily, and with results exceedingly creditable to his energy and ability. Operations were commenced without available capital, and the utmost economy was necessary; but everything has been done in the most substantial manner, and not only with a view to present, but also to future wants. In the summer of 1874 a very rich vein of ore was struck at the surface, on which work has been continued ever since. At the same time the deep cross-cut tunnel which was in about 400 feet reached the vein, and has since been extended 300 feet. An air-shaft has been raised to the surface and a contract let for 1,000 feet of levels, which, when completed, will put the mine in good condition for the steady production of a large amount of ore. During the year 40½ tons of first-class ore was shipped to Omaha, which yielded over \$160,000. Besides this, a large amount of second-class ore was treated in the company's mill, which yielded from \$40 to \$50 per ton. Encouraged by these excellent results, the owners instructed Mr. Lantis to put on a force of 50 men during the winter, but owing to the advanced season the necessary supplies for such an increased force could not be obtained, and there are only a dozen men now employed. At present from 30 to 40 tons of first-class shipping-ore are on hand, and the mill is kept running at full capacity on second-class ore.

The ground adjoining that of the Monarch Company's, formerly owned by A. O. Miller, and comprising 500 feet, was purchased in the spring by the Buffalo Company, which also bought the Silver Tide in Atlanta, and the Itasca in Rocky Bar, from Mr. Tillman. Up to the time of Mr. Wolters's visit, in September, operations had been confined to surface-work, in following up of small seams of rich ore in every possible direction. Since then the company has commenced to push the deep cross-cut tunnel toward the vein. The former owner commenced this tunnel and drove it 150 feet, 160 feet more being necessary to intersect the lode about 110 feet below the upper workings. At the point of intersection an air-shaft will be raised and levels run both ways, and then the mine will be ready for the cheap extraction of ore. Nearly all the surface-work has very little value for future operations. In fact, the finances of the company would no doubt be in a better condition if it had never been done, as the amount of ore extracted will cover only a small portion of the expenditures. The company has purchased and forwarded from Chicago a 10-stamp mill, which is now lying in Kelton and cannot be brought into Atlanta before July. The latter circumstance is, however, hardly to be regretted, as the mill will not be greatly needed before the spring of 1877. Even then the question will arise whether the machinery is adapted to the treatment of the Atlanta ore.

Messrs. Hill & Abbott are at work on their claim in the Atlanta; results not known.

On the Lucy Philipps and William Tell, which are both west extensions of the Atlanta, only so much work has been done as was neces-

sary to hold the claims under the act of 1872; the eastern extension is worked by Turner & Steadman.

The Last Chance is worked by Heath, Newton Brothers & Hogan, and yields extraordinarily rich ore, some lots running as high as \$220 per ton in the mill. Very frequently small pockets full of native gold are encountered. Recently a piece of quartz weighing 5 pounds was pounded up and panned out, yielding 15 ounces of gold, worth \$14 per ounce. Still later 46 ounces of gold, worth \$646, were obtained from $7\frac{1}{2}$ pounds of rock.

The Pomeroy is the west extension of the Last Chance, and is worked by Barnhart, Markey & Mullaly. They employ four hands, have an ore-vein 16 inches wide, which mills \$70 to \$75 per ton, and justly consider themselves fortunate.

The Leonora and Stanley lodes have been leased to Baxton & Orr for five years, together with the 10-stamp mill owned by the Gold-Mining Company of Yuba. Work is progressing steadily on the Leonora, and Mr. Baxter says that he has now ore enough in sight to keep his mill running steadily from April to November without any further development. A run of this ore made in November yielded at the rate of \$80 per ton.

Messrs. Tims, Falk & Irwin are running a tunnel on the Survey lode, and Doolan & Newton are working the Tahoma.

The fact that nearly all the mine-owners are poor workmen, unable to put their mines in condition for continuous working during the long and severe winters, the absence of facilities for transportation and of proper works for the reduction of the silver-ores, together with the high prices for provisions and mining implements and materials, continue to be severely felt by the Atlanta people, but present indications prophesy that in spite of these drawbacks better days are in store for the district.

The following correspondence, taken from the Owyhee Avalanche, gives a good account of the difficulties which have to be overcome and the necessities of the camp:

The magnitude of the mining-interests of Alturas County, and the limited character of their operations up to the present time, suggest the urgent necessity for taking steps to bring the attention of capitalists to the rich mineral resources that here abound. In spite of all the disadvantages that have attended the working of these mines, the slow process of developing them, and the beggarly amount of capital invested, it has been satisfactorily demonstrated that, even with these and numerous other disadvantages, the mines are making some headway. On many of the mines of Atlanta, where there is a mere handful of men at work, rock is being taken out that realizes several hundred dollars per ton. But little effort seems to be made to handle or get at rock that pays less than \$100,* and in many instances I have noticed piles of it that would yield \$20, \$30, or \$40 to the ton laid aside and regarded as unremunerative, there being so much of it in sight of better quality, that attention at present is directed only to the getting of the very best. Men of limited means have become possessed of rich claims, and are working them by slow process, getting quartz crushed in small quantities, and securing enough of the needful to lay in supplies for a winter campaign. By the time these supplies arrive here the cost of everything is nearly doubled, and this, coupled with the impossibility of working mines, even on a limited scale, without machinery, and with many drawbacks, prevents any perceptible headway from being made year after year. This is at present the state of some of the best mines of Alturas County. Capital is the great want here. Greater facilities for transportation are needed. Rich ledges are awaiting development, and with the desirable means at hand for carrying on the work, the bullion product from the mines in the vicinity of Atlanta alone could be easily increased one hundred fold and a population of thousands be made to subsist where there are now only a few scattered residents.

Making due allowance for the hyperbole of the concluding sentence—for it is not “easy” to increase the product of any district “one hundred

* Less than \$50 is probably nearer the truth.—R. W. R.

fold"—the general justice of the foregoing analysis of the situation of affairs in this district must be admitted. In confirmation of the opinions already given in my reports concerning its natural resources, I add in this place a later report on the subject by Mr. J. E. Clayton, received while these pages were in preparation. I omit some criticisms of temporary application.

This remarkable gold and silver bearing district is situated on the Middle Fork of Boise River, in Alturas County, Idaho Territory. Its position is 18 miles northerly of Rocky Bar, and about 65 or 70 miles east of Boise City, the capital of the Territory. Atlanta district lies in the very heart of one of the most wild and mountainous regions of Idaho. For many miles in every direction nothing can be seen but bold granite mountains, and deep narrow gorges cutting into them in every direction, rendering them almost inaccessible except to the hardy mountaineer and wild goats, mountain-sheep, deer, and other wild game common to the great Rocky Mountain chain.

The mountain-sides are covered in most part by dense forests of pine, fir, and spruce timber. In every cañon clear streams of pure water run, leap, and sparkle over their rocky beds, until they unite in one clear, beautiful, little river of two or three rods wide, which has plowed out a gorge through the granite barriers westward until it unites with the North Fork of the Boise, and on its westerly course joins the South Fork, in Boise Basin, before it falls into Snake River.

The only line of approach to this mountainous region at present is from the southwest, by way of Rocky Bar, the county-seat of Alturas County. A fair wagon-road has been made from Rattlesnake Station (on the overland road to Boise City and Eastern Oregon) to Rocky Bar. From this station the road runs northeasterly across the range of lava and porphyry hills into Little Camas Prairie, and thence by the mouth of Lime Creek to the South Boise River, thence up the river 10 or 12 miles to a tributary that joins it from the north; thence up this northern branch and its side ravines to Rocky Bar, a distance of about 55 miles from Rattlesnake Station. Here the wagon-road practically ceases, and the remaining distance of 18 miles one follows a steep bridle-path, or pack-trail, over the mountain-range which lies between the South and Middle Forks of the Boise River. A wagon-way—not a road—has been made across this divide, by which heavy machinery has been hauled over, at great labor and expense, to Atlanta City; but all kinds of supplies that can be packed on mules are transported in the old Mexican style. A fair wagon-road could be made over this route at an expense of \$15,000 to \$20,000, but it would be useful only during the summer and fall months—say about six months in the year. From November to June the deep snow obstructs all communication, except an occasional messenger, who makes the trip across the mountains on Norwegian snow-shoes. Thus, six months of the year Atlanta district is shut out from the world, isolated and alone in the bosom of the grand old mountains. There is one possible outlet that will in time be made for this isolated district—the only one that can be made passable during the winter season—and that is down the cañon of Middle Boise. To build a road down this cañon, a distance of 30 miles, will require \$50,000 or \$60,000, but the importance of the mines of the district will warrant the outlay. This road could be kept open all winter to Boise City, and supplies of every kind would come from that city instead of the difficult and uncertain route by the way of Rocky Bar. Boise City can afford to make this road, independent of any outside help. If her citizens intend to consult their own interest, they must construct radiating lines of road into the important mining-district, so as to concentrate the trade of the interior and make their city the great distributing-point for the western part of the Territory.

The geological formation of Atlanta district is granite, with dikes of syenite and three or four varieties of porphyry cutting through the country in various courses, but generally in easterly and westerly directions, with the general courses of the metal-bearing veins. The largest number of the gold and silver lodes are confined to a partially isolated mountain, situated between Middle Boise River on the north, Grouse Creek on the south, and Yuba River on the southwest sides. On the east it is connected by a low gap with a high and very steep range of granite mountains that trend north and south. The Atlanta Hill, as it is sometimes called, is surrounded by mountains much higher than itself, giving it the appearance of a hill in the center of a grand amphitheater of lofty mountains. Its dimensions are about four miles long from east to west, by two or three miles wide from north to south. Its height above the river at its base is about 1,600 feet, and above sea-level 6,700 feet. Atlanta City, on the flat near the river at the north base of the hill, is 5,200 feet above sea-level.

The vein-system consists in most part of a series of nearly parallel veins, having a course of north 80° west and south 80° east, (magnetic,) and a dip south of 60° to 80°. The number of these veins is not known, but on the north slope of the hill there are four or five which have been worked to some extent, and on the south side there are at least three which have been located and prospected to a limited extent.

This system of veins is generally small, varying in thickness from 6 inches to 8 or 10 feet. They all carry free gold in chimneys or ore-shoots, with barren spaces between. The lodes are all in true fissures, and have well-defined walls, with clay seams between the lodes and their walls.

The Atlanta is an immense lode, that has a course about south 70° west and north 70° east, and a dip south 60° to 70°. Beginning at the east end of the hill, near the west base of the high granite range in the Montezuma Gap, the crest of the hill runs southwest about 3,000 feet; it then curves around to the west and continues tolerably direct a distance of three-quarters of a mile, then turns northwest toward the junction of Yuba creek with Middle Boise. The lode first makes its appearance near Montezuma Gap, and runs through the crest of the hill and across the head of Quartz Gulch at the Monarch Mine. Continuing its course along the north side of the ridge about 3,000 feet, it again crosses the summit and branches into three veins, which trend obliquely down the southwest slope of the ridge toward Yuba Creek. The croppings are traceable a distance of about two miles. All of it has been located and worked along the surface sufficiently to hold the claims good under the law. No developments have been made of a permanent character, except on the Monarch and Buffalo claims. Both of these claims have been tapped by tunnels run from Quartz Gulch, cutting the lode about 100 feet below the surface and about 80 feet below the water-line. The Monarch tunnel gains depth below the cropping as it runs east along the lode into the high ridge toward Montezuma Gap. At the east end of the Monarch ground the level will be 300 feet or more below the surface.

The width of this great lode between the walls is from 40 to 100 feet, and near the point where it crosses the summit toward Yuba Creek it is much larger, but its exact width at this point has not been ascertained by any direct cross-cuts. The metallic contents are gold, native silver, ruby silver, brittle silver, and sulphide of silver or silver-glance. The brittle silver, or black sulphuret, is the most abundant ore; next in quantity and value is the ruby silver. The native silver and the silver-glance are found only in small quantities. The free gold constitutes twenty to forty per cent. of the value. The other minerals are iron-pyrites in moderate quantities, disseminated through a friable granular quartz gangue and a cabby, softish granite, which seems to be a part of the lode, as intercalated seams and masses between the layers of quartz. I saw no traces of copper, zinc, or lead. In fact, this lode carries the purest ores of silver that I have ever seen in any extensive mine.

The Monarch Company's ground consists of 1,600 feet in length on the lode, beginning at a point some 300 to 400 feet southwest of Quartz Gulch, and running east across the gulch into Montezuma Hill. A tunnel has been run from the northwest nearly parallel with the gulch until the vein was cut at a point near the west end of the claim; then it turns east, following the lode under the gulch and into the high ridge or hill above mentioned.

The rich seam of black sulphuret and ruby ore varies in width from 1 to 6 or 7 feet, but alongside of it is a seam of pay-rock that carries a good percentage of free gold with silver-ore disseminated through it. This ore is milled without roasting, but not with good results. The yield in bullion rarely exceeds 40 per cent. of the assay-values. The rich brittle sulphuret and ruby ore is assorted from the mass and shipped East for reduction. I could not learn the amount of ore shipped up to date—common report says five or six hundred tons, that assays from \$800 to \$2,000 per ton. Judging from what I saw of the ore, I should place the average at about \$1,000 per ton. The lower grades of ore are taken to the company's mill, just below Atlanta City, a distance of about two and a half miles from the mine. The second-class ore is said to have an average value of \$150 per ton, but whether that sum is the product in bullion or is the assay-value, I did not learn. The ore I saw hauled to the mill during the week of my stay in the district appeared to be much richer, I should say not less than \$300 assay-value.

The work at the mine should be thoroughly surveyed and a shaft started "to the deep" with hoisting-works and pumps to put it down 1,000 feet, and at each 100 feet levels should be run each way to open and drain the ground. In the second place, a good 40-stamp mill should be erected, with furnaces and appliances of the best patterns to reduce all the ores on the ground, and stop the folly of sacking and shipping the ore 2,000 miles to be reduced. A wagon-road should also be made down the river to Boise City, so that the bullion could be sent out daily by stage all the year round.

This would not be all the good results of such change. Every claim in the district would be explored, many other mills erected, the population increased to two or three thousand souls, and the bullion product brought up to several millions per annum.

The Buffalo claim adjoins the Monarch Mine on the west, and extends westerly on the lode 480 feet. This mine is opened also by a tunnel from Quartz Gulch, which cuts the lode near the center of the claim 100 feet below the surface. A level has been driven west about 100 feet, all the way in good ore. Another level has been driven east, following the rich-ore streak toward the Monarch a distance of over 100 feet at the date of my visit, (September, 1876.) The grade of ore is about the same as that

in the Monarch Mine, and is identical in character in every respect. The rich-ore streak varies from 2 to 6 feet, with large quantities of lower grades alongside.

There are no preparations for opening the mine below the tunnel-level, and no efficient means of reducing the rich ores on the ground. There is a 10-stamp mill in process of erection on the river below the town, to be driven by water-power, but no furnaces for roasting the ore. There is talk about putting up a Bruckner furnace next year. At present they ship their first-class ore, and are accumulating the second-class at the mine and the mill-site.

West of the Buffalo Mine there has been no exploration below the water-line, and but little work of any kind has been done except surface-cuts and holes dug to trace the lode and do enough work to hold the claims good against jumpers and relocators. No rich ore is found in the surface outcroppings anywhere on the lode, except that now and then some free gold is found. The surface-dirt all contains gold the whole length of the vein, but no rich silver-ore is found on the surface, not even any distinct traces of chlorides of silver. The country-rock being a primitive granite formation, there is no chlorine in it, and hence no chlorides of silver have been found in the croppings of the vein. The croppings have been impoverished by oxidation and leaching out by the surface-waters.

The oxidation of a sulphuret of silver changes it to a sulphate which is soluble in water. If chlorine is present, the silver becomes fixed as an insoluble chloride; but if it is not present, the sulphate dissolves and goes out with the surface-water, or else settles down below the water-line and redeposits as a sulphide, or as native silver, if the proper chemical reagents are present. This, I think, is the true explanation of the absence of rich silver-ores in the croppings of the Atlanta lode. It does not follow that the lode carries rich silver-ore below the water-level throughout its whole length. If it did, it would be a remarkable exception to the general rule. The probabilities are that there are a number of rich chimneys in the lode, with poor, or even barren, ground between them; but as the rich silver-ore does not come to the surface, the position of the rich-ore bodies can only be ascertained by actual explorations. As a rule, however, those portions of the outcrop that carry the most free gold will be the places most likely to have rich silver-ore below the water-line. Fortunately, the water stands in the lode very near the surface. This is owing to the character of the country-rock, a softish granite, with all the seams filled with clay, holding the water very near the surface, except where deep ravines cut across the lode so as to drain the water from the vein on each side. And even along the line of the lode the water does not escape readily, for the reason that the joints and seams in the vein have been filled with clay by infiltration so as to hold the water permanently within a short distance of the surface. For this reason the permanent water-line in the Atlanta lode is not a horizontal line, but one closely approximating to the surface profile of the lode itself.

There are many details of an interesting character that cannot be embodied in this paper without taking up too much space. My present aim has been to give a brief outline description of the district, and the peculiarity of the great lode which is its most striking feature.

BOISE COUNTY.

Banner district.—Mr. Crafts has new reduction-works nearly completed, ten stamps being in complete running order and but little work being required to finish the other ten. The mill was erected according to the plans and under the supervision of Mr. Anderson, and it is as substantially built and as well planned as any silver-mill in the West. It contains 20 stamps, of 650 pounds weight each, which discharge through a screen of 40 meshes into a screw-conveyer, which brings the ore to the elevator. This lifts it into another screw-conveyer, by which it is discharged into the feeding-apparatus on top of the chloridizing roasting-furnace. The latter is a combination of the Stetefeldt and reverberatory patterns. The ore is distributed into the furnace by means of a revolving wheel, falls through the shaft into the reverberatory, consisting of three compartments, and here accumulates until a certain weight is reached, which lifts a lever and allows the ore to drop without any further aid. The amount of ore collecting on the hearth-plate before it turns and discharges can, of course, be regulated by increasing or diminishing the weights attached to the lever. It is claimed that a higher percentage of silver is chloridized by leaving the ore some length of time in the reverberatory; but even if this is not the case, the

self-discharging apparatus is a decided improvement. The gases pass through a long horizontal flue covered with iron plates behind the stamps, which serves for drying the wet ore, and as a condensing-chamber. The ore discharged from the furnace is conveyed in the car on a track to the pans, and discharged into them by dumping the car. There is one pan for every five stamps, and there are, in all, three concentrators. The motive-power is furnished by a fine 60-horse-power engine with two flue-boilers. A test-run of five tons was made, which yielded about \$100 per ton, and proved the machinery to be in good working order.

The completion of this mill will doubtless give a strong impetus to the development of the camp, and will prove a great benefit to the district; whether it will be a financial success in the near future is another question, which cannot yet be answered. Though it took two years to so far finish the mill as to get one-half its capacity in running order, and there was, consequently, plenty of time to get the mines connected with it pretty well developed, this was done only to a very limited extent, and the total result of the mining operations during these two years is represented by 500 tons of ore. During this time, of course, most of the work done consisted of sinking and drifting, and by stoping next year probably four or five times as much ore can be obtained in one year; but even that will not keep the mill running to its full capacity for more than five months, and no neighboring mine is in condition to make good the deficiency by custom-work.

The work done on the Banner lode amounts to very little. Neither the shaft nor the levels have been extended one foot, and operations have been exclusively confined to stoping out some good ore above the old levels, at a depth of 35 or 40 feet, and to some surface-work 200 feet east of the shaft. The lode, where opened, is well defined and carries a strong body of ore.

A good deal of dead-work has been done on the Wolverine lode, the cross-cut tunnel having reached the lode, and the shaft having been sunk to the point of intersection. As the three upper sets of timber and the cribbing in the shaft had given way, making the occurrence of a slide probable at any moment and the descent a dangerous one, Mr. Wolters could not enter this mine.

The Crown Point, owned by Crafts & Grant, is on the same vein near the crest of the hill, and comprises 1,000 feet. A cross-cut tunnel strikes the lode 40 feet below the surface. Levels have been run east and west 58 feet and 52 feet, respectively; a shaft has been sunk 54 feet and an air-shaft is raised to the surface. The ore-vein, so far as developed, is very strong, there being in places from 3 to 4 feet and nowhere less than 18 inches, which will probably average \$75 to \$80 per ton. The work on this lode has been done by Mr. Grant in a very substantial and creditable manner.

Beyond the ridge, a short distance from the Crown Point, is the Galveston lode, discovered this summer by Mr. Grant. A cut 4 feet deep represents all the work done on it. This shows a good-looking crevice 5 feet wide, with a 30-inch vein of ore similar to that of the other lodes.

Very little work beyond that necessary to hold title under the provisions of the act of 1872 has been done on any other lodes, a fact which is much to be regretted, as every pound of ore that can be produced by the mines of this district will be of importance in helping to keep the mill steadily supplied, and thereby insuring its success.

Mr. Crafts has invested a large amount of money, and has erected as fine a silver-mill as can be found in the Territory; and since his own

lodes are not able to supply, at least for some time to come, all the ore required, it is clearly the interest and the duty of the owners of outside lodes, which, but for his enterprise, would not be worth anything, to do their best for themselves and him by going to work at once and producing as much ore as possible.

Between Banner and Idaho City, about six miles east of the latter, are the Gambrinus, owned by Mr. Plowman; the Sub-Rosa, owned by Mr. Hooten, and the Keep Cool. Some very fine ore has been obtained, especially from the first two lodes, the ore from the Sub-Rosa ranging in value from \$45 to \$100 per ton. As to the state of development in this lode, I am not informed. The ore from the three lodes is now worked in a 10-stamp mill owned by Mr. Plowman. It is run by water power, and has been in operation not quite continuously all summer.

Quartzburgh district.—The Gold Hill Company, which has thus far worked its mine only above the water-level, stopped work in mill and mine in July and commenced sinking an incline 150 feet long and gaining 100 feet vertical depth at the southwest side of the creek. The mill in the mean time was thoroughly overhauled and improved, the copper plates were exchanged for silver-plated ones, and the length of the sluice-boxes doubled. The old copper plates yielded \$12,000.

In sinking the incline the owners had to contend with a very large amount of water, and it was not finished until the latter part of November. A cross-cut was then started, forming a large curve 30 feet long, this shape being chosen for the purpose of doing away with the necessity of a turn-table. The vein was reached in December, and shows as well in width and quality as in any other part heretofore developed.

Very fine hoisting-works, manufactured by Hawkins & Bartrell, of San Francisco, were erected at the mouth of the incline. The 40-horse-power engine is a portable, double-hoisting one, with link-motion and double reels. It takes up, with hoisting-apparatus, only a space of 14 by 20 feet, and works with great precision. The drums are 32 by 36 inches. A circular saw will be run by the engine for the sawing of timbers and lagging, which will save a large amount of work and money. A plentiful supply of everything needed for the mill and mine during the winter has been laid in, representing a cash-value of at least \$25,000.

Nothing has yet been done with the large amount of concentrated tailings on hand, estimated at present at from 5,000 to 6,000 tons. The great trouble experienced in disposing of these tailings is that they are probably not rich enough to stand the expense of roasting, and so far no satisfactory results have, to my knowledge, been obtained without it.

The Iowa lode is owned and worked by the Boise Mining Company. In the upper level the ore has been stoped out 150 feet high for a distance of 150 feet north and 100 feet south. In the lower level the vein is considerably broken up, and lies so flat that the ore requires much handling to bring it through the shoots. The ore has yielded heretofore from \$5 to \$18 per ton, averaging from \$6 to \$7; the expense of mining and milling amounts to \$5 per ton. In the present workings the ore has depreciated in value and the additional amount of labor required in handling takes away all profit. Owing to this fact the owners will quit work in the mine altogether for the present and complete the upper cross-cut tunnel on the Gold Hill extension or Growling Go lode, which also belongs to them. The tunnel will have to be extended 50 feet to strike the lode, and when the levels have been run there will be a body of good ore overhead, 100 feet high, ready for stoping. The tram-way over which the ore from the Iowa is brought to the mill will also be used for the Gold Hill ore. If the ore in the upper part of the Gold Hill ex-

tension proves of satisfactory quality, the company will also complete the lowest cross-cut tunnel, which is now in 200 feet, and which, when finished, will bring in 400 feet in depth on the south and 600 feet on the north end of the claim. This tunnel is on a level with the mill, and can be finished at a comparatively small expense, the ground being of a character so favorable that 130 feet has been run in one month. The ground in the Iowa is also very soft, only 200 pounds of powder having been used for blasting in the last seven months.

The mill is small, but substantially built and well arranged. It contains 10 stamps, of 650 pounds each, making 80 drops of 8 inches per minute, and crushing 20 tons per day. The engine has 60 horse-power, but the two tubular boilers have only a capacity of 25. Two copper plates are used in each mortar-box, on which 80 per cent. of all the gold extracted is saved, the remaining 20 per cent. being caught on the copper tables. The bullion from the battery is from 850 to 860 fine, while that from the tables is only 800 fine. Russian screens are used, the discharge being 6 inches above the dies when new.

About a mile above Quartzburgh is the Lawyer lode, now owned by Messrs. Hart, Carroll, Dougherty & Morehead. A cross-cut tunnel 500 feet long taps the lode at a depth of 230 feet from the surface. The crevice is well defined and carries a good body of ore, which mills from \$10 to \$20 per ton.

In Cañon Creek, 4 miles from Placerville, some new lodes were discovered in July, which, by the extraordinary richness of their surface-ore, created a considerable excitement throughout the Boise Basin. The principal locations are the Chief and Ebenezer and some placer-claims below the former. So far very little progress has been made in the development of the lodes, but next spring will probably witness a great deal of activity. A lot of ore was to be taken over to the Boise Mining Company's mill for crushing, but I have not learned anything about the result. In Summit Flat some work has been done on the Golden Era lode by Freeman, Johnson & Charbonneau, and next season several other mines will probably also be worked again.

The prospects for a prosperous quartz-mining season are generally bright through the whole county. The Gold Hill Company and possibly also the Boise Company will work steadily and turn out a large amount of gold. Banner will come in as a silver-producing camp, and if the Cañon Creek mines are only half as rich as reported, they will make a respectable contribution in the bullion product.

IDAHO COUNTY.

Very little work has been done in this county on quartz-lodes, owing to the difficulties attending mining here. The following circular, issued by citizens of Warren's, the principal mining-camp, gives a complete and, as Mr. Wolters attests, also a truthful and in no way exaggerated account of the condition and resources of that district:

Washington quartz-mining district.—Among the many localities where gold and silver quartz veins have been found west of the Rocky Mountains during the past fifteen years, the Washington district, of North Idaho, has received comparatively little or no attention from capitalists, apparently owing to a combination of causes and influences over which those discovering them and holding them have had no control, and yet the few geologists and mineralogists who have visited this district, examined the veins as partially opened, and tested the ores, have universally pronounced it the best district upon the coast, in view of the number of its veins and the average richness of its ores of gold and silver.

This district is situated in what are called the Salmon River Mountains, about 15 miles south of the main Salmon River and about 10 miles west of the main south fork

of said stream, in about latitude $45^{\circ} 30'$ north and longitude 115° west of Greenwich, in Idaho County, Idaho Territory.

The district embraces a basin in these mountains, with the gradual elevations surrounding, and has an area of about 10 miles square. Its elevation is from 6,500 to 7,500 feet above the level of the sea. The hills and valleys are covered with a growth of black pine timber of dimensions from the size of a fishing-rod up to twelve and fifteen inches in diameter, with here and there in the gulches clusters of spruce and white fir, and on some of the points of the hills red fir trees are found of the dimensions of two and three feet in diameter.

It has one main stream cutting the heart of the basin and passing through a gorge in the mountains and emptying itself into the main Salmon River. Many small tributaries from the ravines and gulches supply this stream, and furnish, at all seasons of the year, an abundant supply of water for quartz-mining purposes with steam-power, while the main stream in many places furnishes ample water-power to propel quartz-mills of small capacity, during eight months of the year.

This district is located about one hundred miles distant from the agricultural settlement of Camas Prairie on the northwest, and about one hundred and twenty miles from a similar settlement on the Weiser River on the south side of the main Salmon range of mountains, and there are but very few farms or ranches cultivated within that distance of the district, and these are along the cañons of Salmon River and South Fork of said stream.

The nearest mart of importance where supplies can be obtained for the district is Lewiston, at the head of the present navigation of Snake River, at its junction with the Clearwater, a distance of 160 miles. A smaller town at the foot of the mountain, on Camas Prairie, is 100 miles distant, and at present is only reached for supplies by pack-trains over a good mountain-trail, which has been in constant use since 1862 as a thoroughfare for travel and supplies for the placer-mining camps of Florence, 50 miles distant, and for this camp. The district is about 200 miles a little east of north from Boise City, the capital of Idaho Territory, and for most of this distance travel is performed on the backs of animals over a good mountain-trail.

The district is supplied by two mail-routes, one by way of Lewiston and Florence, and the other by way of the Weiser and Payette Valleys. The former makes weekly trips through the year, and the latter weekly for six months of the year and semi-monthly the other six months.

The snow commences to fall about the first of November, and varies in depth in different winters from three to six and seven feet, and seldom entirely disappears till the month of June. The trails leading into the district are generally blockaded with snow against travel with animals about five or six months each year, but could be kept open if the business of the camp was such as to induce daily travel over them. The routes are generally well sheltered by standing timber, so as to protect them from winds and drifting snows. The winter trail to Lewiston reaches the main Salmon River about 35 miles from the district, and from that point to Lewiston and all the lower country of the Snake and Columbia Rivers the routes are always open for travel with animals. The travel in winter in and about the camp is principally done on Norwegian snow-shoes, except when the business of parties is such as to require the use of animals, and then roads are broken and beaten through the snow for that purpose. The difficulty of maintaining good roads for animals during the winter in any part of the district is no greater than in the States of Vermont, New Hampshire, Maine, and many parts of Massachusetts, and not so great as on the prairies of Illinois and other States where the snows are in drifts.

The mean temperature of the weather during the months of December, January, and February, the coldest months of the year, is from 20° to 25° above zero, and seldom is found to be below zero, and then only for a few days of the season, while it frequently will range for days from 35° to 50° above zero. There were two or three days about the middle of January, 1875, when the mercurial thermometer, at 6 o'clock a. m., indicated 35° below zero, which was the coldest period save one ever known in the district since it has been inhabited by miners.

This district has been worked by placer-miners since 1862, and from it has been taken an amount of gold equal to that of any camp of its size in Idaho Territory. It has always been known as "Warren's Camp." Its placers now are nearly exhausted, except for the Chinese, who will continue to make from \$1 to \$3 per day per man for some years to come.

Wages of white men in the mines during the past season have been from \$4.50 to \$5 per day, while Chinese labor has been \$2.50 per day.

The placer-gold has been taken from the creek-bottoms, gulches, ravines, and points of hills projecting into the creek-bottoms.

The existence of quartz-ledges bearing gold has been known to some placer-miners from the earliest period of placer-mining in the district, but by men who placed but little value upon quartz in any country. In the fall of 1865 a silver-vein was discovered a few miles from Florence, and its discovery awakened some little attention, which

afterward induced some prospecting for quartz in the summer of 1866, and first led to the discovery of the Washington gold and silver vein in this district, and soon afterward the Western and a few other veins. In July of that year the few who had made discoveries and locations in this district convened and established the boundaries of the "Washington gold and silver quartz mining district," and framed their laws relative to the discovery, location, and representation of quartz-claims in the district. This action gave an impetus to quartz-prospecting, and before the first of December of that year upward of one hundred distinct veins had been discovered and partially uncovered, and locations recorded upon them all.

Late in August of that year, Mr. George Hearst, of San Francisco, Cal., in company with one Williamson, paid this camp a visit, having previously followed the noted Robeson into the mountains of the northern part of the Territory, till they became satisfied that he was, and had been, deceiving them about the location of his rich ledges. These men spent some twenty days in examining the ledges then partly uncovered in this camp, and Mr. Hearst caused to be published a letter over his own signature, in which he pronounced the surface-prospects of the ledges of this camp equal, if not superior, to those of any other camp he had ever visited upon this coast, and urged the miners to sink down upon their veins and develop them, and if they proved as good below as upon the surface, they might be assured that capital could readily be had to place them in a working condition and bring reduction-works into the camp. He lamented the absence of good wagon-roads, over which proper reduction-works could readily be transported, and the remoteness of the district from San Francisco, the seat of the quartz-mining capital of this coast, and the length of the winters here.

His opinions, however, as then given, inspired much confidence in some miners who had before become interested in quartz, and they commenced with renewed vigor to sink upon their claims. But by far the great majority of the miners of the district could not be induced to co-operate in the development of the ledges, and traders and supply-men, if at all, gave a very reluctant countenance to any and all quartz-men.

As a result of this disposition on the part of the traders, except in a few isolated instances, prospecting for new ledges, as well as sinking upon those found, for the most part ceased in the fall of 1866, and the great mass of the claims then located, recorded, and represented under the district laws, has been left entirely untouched from that day to the present.

But a few men of more faith and energy than others, without means, save their own labor, have persevered, in defiance of the obstacles which beset them on every hand, and have done something toward the development of a few ledges. Shafts have been sunk on some of them varying in depth from fifty to two hundred and fifty feet, and in no one thus opened has the vein disappeared or lessened in size, but with great uniformity they have gradually increased in size of crevice between walls, and thus demonstrated the fact that they are true fissure-veins, giving prospects of still greater size below.

The ores taken from these shafts have proved as good at the bottom as at the surface, and the average yield per ton of the ores in free gold, by battery-mill process, without any attempt to work them for the silver, has been from \$12 to \$90. The assays made of the silver-ores taken from these different ledges have been returned from \$40 to as high as \$12,000 per ton. Assays of large samples of the gold-ores have been returned as high as \$10,000 per ton. These highest assays, as might be expected, have been made from selected portions of the veins.

Of the ores which have been milled for free gold by the battery process alone may be mentioned ores from the following veins, to wit:

	Tons.	Average per ton.
The Hic Jacet	90	\$43 00
The W. B. Knott	350	29 00
The Keystone	50	65 00
The W. Scott	150	56 00
The Alder	20	17 00
The Rescue	3,500	22 50
The Charity	1,000	15 00
The Samson	300	24 00
The Uncle Sam	10	17 00

Several of these veins have produced assorted ores, in quantities of from seven to twenty tons, which have yielded at the rate of from \$50 to \$270 per ton. The first ten tons from the W. Scott, assorted and milled, yielded \$179 per ton. The first three tons assorted from the Hic Jacet and milled in an arrastra, yielded \$270 per ton; and five tons afterward, assorted from twelve tons as it came from the mine, were sold in San Francisco for \$155 per ton to European shippers, who paid only 60 per cent. of its value as tested by the pan process. Several small lots from the Keystone were milled in an arrastra, and yielded upward of \$90 per ton. One lot of assorted ore from the W.

B. Knott yielded \$129 per ton. Several lots from the Rescue, assorted, yielded from \$50 to \$75 per ton by the battery process alone.

Many gold-bearing veins in camp whose surface-croppings, from assay-tests made, appear richer than any of the above-named, have never been worked, and not a ton of their ores has ever been milled by arrastra, pan, or battery process, and are now lying entirely neglected, and some of them abandoned by their former owners, for want of energy in themselves and capital to open and work them.

One man in the district who has a small arrastra has, during the past two seasons, worked with his own hands and alone in gathering up drift-rock and extracting from mines which he owns, hired the ores packed on mules to his arrastra, in some cases for miles at high freights, milled the ores himself, and made more money than any placer-miner in camp, in the same length of time, and could that man to-day command the requisite means to properly open his ledges, and have proper reduction-works for his ores, he would show to the capitalists of the country a greater profit upon his investment than is shown by thousands who invest their money in merchandise, trading, and stock speculations and land.

Of the silver-ledges which have been tested by first burning the ores when extracted and milling them in an arrastra, may be mentioned the Martinas, Bullion, Black Hawk, and the Knott Treasure. The first yielded in that manner \$238 per ton; second, \$50; third, \$65; fourth, \$60. With the imperfect means employed in reduction of these ores, these tests made cannot be regarded as full and fair tests of the value of these ores.

The silver-veins are numerous in this district which prospect better than these. A small stratum of ore found in the Martinas has assayed richer than any other silver-ore ever yet tested in the district. But silver-ledges are almost entirely neglected and are in waiting for capitalists to take hold of them and erect the proper machinery for the reduction of silver-ores.

One serious obstacle to the investment of capital in the quartz of this district has heretofore existed in the territorial and district laws relative to the size of an individual claim and the extent and manner of representation. An individual claim upon a vein was only two hundred feet of the length of the vein with fifty feet on each side, which could be held as *real estate*, under the above laws, by the expenditure of twenty dollars upon the claim at any time within twelve months after date of location, and no annual representation subsequent to said twelve months was required to enable the party locating to hold the claim as his property against all others. Under this provision a large number of claims were located upon the best veins then discovered, and were fully represented by the said amount of expenditure, and have never been touched since the first year. These could not be molested by others without violation of district laws, nor could a sufficient number of feet upon any one vein to form a contiguous claim of the proper extent to induce capital to either purchase or expend money to prospect it be united in interest, owing to separate rights and conflicting opinions of the claimants adjoining.

But the law of Congress of May, 1872, making an annual representation requisite, (notwithstanding the several extensions of time for the first representation under the law,) has caused a forfeiture of the rights of these neglecting parties, and now a large number of valuable claims are open for relocation under the laws of Congress. The district has also made its laws to conform in all of their provisions with the laws of Congress.

Some relocations have been made under the act of 1872 and its amendments. Among these are the Martinas, W. P. Hunt, Samson, Hic Jacet, W. B. Knott, Knott Treasure, Winfield Scott, Black Hawk, Washington, Uncle Sam, (now called "Alhambra,") Rescue Extension, (now called "Right Wing,") J. Greenfield, Jeunie Leland, I Excel, (now called "Davey,") George Hearst, Hawk Eye, (now called "Blue Bird,") Andy Johnson, Laurel, Emerald, Copper Lead, (now called "Juniper,") Ramey, (now called "Ruby,") and some others.

Several new veins have been discovered; among them are the Alta and Antler, two large gold-bearing ledges, also the Roebuck. All these relocations and new discoveries are now in the hands of parties who have not the means of properly opening the veins, but they have been located with the view of offering the controlling interest in them to any capitalists who will give guarantee of their being well prospected and operated if found to be as good below as they now prospect upon the surface.

It may here be said that the reduction-works which have as yet been erected in the district have all been of a light and rude character, entirely inadequate to the saving of a large percentage of the valuable metals contained in the ores. Before the proper reduction-works can be transported here a wagon-road must be constructed. To construct such a road over which heavy machinery can be transported will cost an expenditure of from \$10,000 to \$20,000, according to the different estimates made by roadmen who have examined the different routes. But the men of the district are not disposed to construct such a road without some assurance that they can induce capital to take hold and develop these mines and place here the proper reduction-works, which

the men of the district are entirely unable to place here, even when a suitable road is constructed.

It may here be further remarked that the veins now known to exist here contain gold or silver, or both, and vary in width from 6 inches to 4½ feet upon the surface, and as developed below the surface they have almost invariably increased in width. The walls are granite. The slate formation crops out as descent is made from the summits of the surrounding mountains to Salmon River and the South Fork of said stream.

From the above facts it may be readily inferred that the real wants of the district, to make it highly prosperous and productive in gold and silver bullion, are: first, a sufficient amount of capital judiciously expended to properly open and develop the quartz-veins of the district; second, a good wagon-road into the district, over which proper reduction-machinery can be transported, and supplies furnished for the miners at moderate prices; third, well-skilled and efficient quartz-miners and mill-men to operate the mines and mills when opened and constructed in the district.

WASHINGTON, IDAHO, November 17, 1875.

The undersigned, citizens of the Washington quartz district and of Idaho County, Idaho Territory, hereby certify that each for himself has heard read the foregoing statement of facts pertaining to the situation, condition, and prospects of said district, relative to its mines and the requisites of the district to make it highly productive in gold and silver, and that the facts therein set forth are true and nothing overdrawn.

J. W. POE,	CHAS. JOHNSON,
<i>Attorney at Law.</i>	<i>Quartz-Miner.</i>
S. P. C. HOWARD,	G. W. DYER,
<i>Member of Legislature.</i>	<i>Mechanical Engineer.</i>
GEO. CHURCH,	A. BEMIS,
<i>Treasurer Idaho County.</i>	<i>Amalgamator.</i>
A. H. SANDERSON,	B. F. MORRIS,
<i>Justice of the Peace of Idaho County.</i>	<i>Auditor and Recorder.</i>
A. FRIEDENRICH,	C. W. CASE,
<i>Postmaster at Washington.</i>	<i>Sheriff of said County.</i>
NOAH DAVEY,	L. P. BROWN,
<i>Superintendent of Rescue Mining Company.</i>	<i>Member of Legislature.</i>
SAMUEL LARGE,	J. M. CROOKS,
<i>Miner of Washington.</i>	<i>A Citizen and Old Resident.</i>
M. STORMS,	CHAS. BENTZ,
<i>Secretary of Rescue Company.</i>	<i>A Citizen and Old Resident.</i>

TERRITORY OF IDAHO,

County of Nez Perce, ss:

I, Hazen Squier, clerk of the district court of the first judicial district of Idaho Territory, hereby certify that I am personally acquainted with the persons whose names are signed to the foregoing certificate bearing testimony to the situation and character of the placer and quartz mines of the Washington district, Idaho County, Idaho Territory; that I know them to be men of good character and standing in said Idaho County, whose word is entitled to full credit among all men wherever given, and that most of them have long been residents and doing business in said Washington district, and are well informed of the facts to which they have certified.

Given under my hand and the seal of the said district court this 21st day of December, A. D. 1875.

[SEAL.]

H. SQUIER,
Clerk of District Court, First Judicial District, Idaho Territory.

Mr. Wolters adds to this statement that he does not know of any mining-camp where such liberal inducements are offered to capitalists as in Warren's. The miners of this camp form an exception to the general rule. They are not sanguine, though they are perfectly aware of the fact that they have a large number of promising veins; they realize the extent of the difficulties with which they have to contend, and know that a company of moneyed men taking hold of their camp will have to spend a considerable amount of money before they can expect to recoup their investment. Knowing all this, the citizens have the good sense not to expect any capitalist to come and offer them large sums of money for their half-developed lodes. They ask only that some one shall come, erect reduction-works adapted to the treatment of their ores, and help them to construct a good wagon-road into the camp. In consideration of this, they will give him a large interest in their lodes; and from personal con-

versation with the leading men, Mr. Wolters thinks that any company willing to expend from \$100,000 to \$125,000 for the above purposes could get one-half interest in nearly every lode in the district.

OWYHEE COUNTY.

The past year has not been a prosperous one for the Owyhee mines. Being almost entirely owned and worked by San Franciscans, the failure of the Bank of California and the embezzlement by an absconding defaulter of large amounts of money belonging to the Mahogany, Poorman, and Silver Cord companies, dealt them a severe blow, from the effects of which they have but partially recovered. It will probably require another season before the former activity and prosperity will be restored.

All efforts by Mr. Wolters to obtain reliable data about the mines of War Eagle Mountain, and especially the amount of ore produced, yield, &c., from superintendents and through influential outsiders, have proved a failure. It seems that the Owyhee companies do not want to have anything known about their property, unless they are able to make a very favorable impression; but the bullion production of the camp, which always becomes public, furnishes a very good criterion by which to judge the condition of their mines. The fact that they are so often closed to the public is taken by many as a sign that the property is either not worked with a view to make it pay, but with a view to force stocks up and down, or that it is not in a fit condition to be shown to the public.

For the information given below about the War Eagle Mountain, I have had mainly to rely on the reports furnished by the Silver City Avalanche, from which extracts have been freely made.

While last year the Golden Chariot was the leading mine of the camp, the old Oro Fino has come this year to the front again, and, to judge from present indications, it will retain the lead for some time. In August new hoisting-machinery of 100 tons daily capacity was erected, which is expected to serve all purposes to a depth of 1,400 feet. The main building, containing the engine, boilers, and hoisting-machinery, is 44 by 86 feet, with an addition of 18 by 86, which serves as a coal-shed and blacksmith and carpenter shop. The engine is 35 horse-power, the cylinder 12 by 24 inches. Three boilers of 42 inches diameter and 14 feet length are there, two of which furnish the steam for the hoisting-engine, while the third works the air-compressors for the Burleigh drill. The hoisting-works have only one reel, but there is room enough for another when necessary. Clutch and brake are operated with hand-wheels and screws, and are with ease controlled by the engineer. An indicator is attached to the reel, to show the exact position of the bucket or cage in the shaft. The exhaust steam is condensed in a tank, and serves to heat the water for the boilers.

When mining was resumed after the completion of the works in August, the shaft was down 327 feet, 200 feet of which were timbered and lined ready for the cage. The width of the lode in this shaft varies from 3 to 10 feet, the ore yielding from \$25 to \$35 per ton, but later in the season it improved considerably in value. Lately the new superintendent commenced underhand stoping in the first level at a point 300 feet south of the shaft, working 20 feet deep and running 40 feet toward the shaft. Here he struck a deposit of very rich ore, and, after having become satisfied of its large extent, raised a winze from the second level, starting 280 feet south of the shaft. This is now in 15 feet, and shows

a strong vein of rich ore, assays of which indicate a value of several hundred dollars per ton. The third level also looks well, and in the stopes now worked here the crevice is from 10 to 12 feet wide, yielding a large amount of average milling ore. The shaft is now sinking farther, and the superintendent intends to start two more levels during the winter. If the newly-discovered body of rich ore extends so far down, the Oro Fino will yield a larger amount of bullion next year than it ever did before.

The Golden Chariot and Minnesota Mines have been consolidated this summer, and now form one claim 760 feet long, with two shafts, 1,050 and 900 feet deep, respectively. In the lower workings the lode is from 2 to 4 feet wide, and in the eighth, ninth, and tenth levels a large body of good ore is exposed, which will be extracted next spring. New hoisting-works have also been erected, which are thus described in the *Avalanche* of January 1, 1876:

The new works at the Golden Chariot Mine are the most substantial and durable in the Territory. They will be ready for operation early in the new year. Several months' time having been unavoidably taken up in the construction of these works, the operations in the mine have during that time been quite limited, but now that everything is in splendid trim for the resumption of work, we expect to see the Golden Chariot take its place, as of yore, and contribute more largely than ever to the bullion-product of the camp. Having been always recognized as a leading mine, embracing rich and extensive ore-bodies, it is a source of gratification to all interested to find that the enterprising company controlling this mine have not lost faith in its productiveness, and have been ready and willing to demonstrate their belief in the existence of unsurpassed mineral resources in this camp. They have expended the sum of \$90,000 in carrying out and completing works which will stand as a monument to their energy and enterprise, and we predict that the time is not far distant which will prove to them the judiciousness of their investment, and leave no room for doubt as to the wisdom of their course in taking steps to develop the mine on a large scale. No expense has been spared to make the works complete in all their details, and to combine all the modern improvements requisite for the expeditions working of the mine and the taking out and shipment of the rich rock that is known to exist in abundance here.

The new shaft-house is 86 feet in length, 50 feet wide, with walls 21 feet high. It has a cupola 16 by 43 feet in size, with walls of 16 feet. The gallow's-frame is 40 feet high. All the timbers and materials used are of the best and most durable description, and will bear the test of a most critical inspection. In proximity to the shaft is a large tank with two compartments, one of them being designed as a receptacle for clean water and the other for muddy water. There is also a third tank, erected on the platform, into which the water is pumped for use in the boilers. The sheaves are 8 feet in diameter. On the south side of the shaft-house is a building 70 feet long by 18 feet wide, with 12-foot walls, designed for a carpenter and blacksmith shop and coal and wood house.

The engine, which is 144 horse-power, is of great strength and very compact, the bed in which it is located being blasted from the solid granite and anchored to the same by 14 $\frac{1}{4}$ -inch bolts 8 feet long. The cylinder is 22 inches in diameter, with 42-inch stroke. The fly-wheel weighs 8 tons, and is 16 feet in diameter. The crank-shaft is 8 inches in diameter, the reel-shaft 10 inches, and 12 feet long.

The hoisting-gear consists of a double reversible reel 8 feet diameter and 16 inches face. The bed for the reel-gear is blasted from solid granite and anchored by 16 $\frac{1}{4}$ -inch bolts 8 feet long. The large spur-wheel is 10 feet in diameter, with a 12-inch face, and weighs 5 tons. It is driven by a heavy pinion of 3 feet diameter and 12 inches face. Most of the heavy machinery was manufactured by Prescott, Scott & Co., in San Francisco, and its solidity and strength are unsurpassed in the works of any mine on the Pacific.

The boiler is set in brick and cut granite. It is 56 inches in diameter and 16 feet long, combining 2 large tubular boilers, each containing 42 $\frac{1}{4}$ -inch tubes. The height of the stack is 60 feet above the breeching. The pump used to supply the boilers is of the new Wilcox pattern, and is arranged to throw water over the entire building in case of fire, and also to carry water from the lower to the upper tank, where it is heated by the exhaust steam from the hoisting-engine and then forced through a heater into the boilers at a temperature of 160°, thereby effecting a great saving in the use of fuel.

The plan originally designed for throwing the reel-clutches in and out of gear has been altered and greatly improved by compounding the levers in such a way as to

enable the engineer to adjust them without leaving the engine. Another great improvement has also been made in connection with the furnaces, which consists in supplying a draught of superheated air through a coil of 4-inch tubing placed in the ash-bed, which receives the cold air through a register into the pipe, and discharges it at a very high temperature at the immediate point of combustion.

Concerning the operations which are about to be commenced in the mine, the indications are favorable for a splendid development. In the second level south, from which 25 tons of ore were extracted recently, which yielded \$125 to the ton, there is a large space, which has not yet been explored, and from the working of which the most promising results are anticipated. A drift was run in there several months ago, which disclosed a fine body of ore, but in consequence of the removal of the old works operations in this section of the mine were temporarily abandoned. A winze will be sunk on this ore-body from the Minnesota ground, and the superintendent expresses the belief that from the ore which is in sight not less than \$10,000 will be realized per month. The ledge is about 2 feet in width and shows up very favorably in rich rock. All the past developments in the Golden Chariot point to the existence of a much wider ledge in this vicinity, the work of opening which will be prosecuted without delay. In a few weeks work will also be resumed on the fourth level, and at points between the ninth and tenth levels, where profitable operations were carried on while a former superintendent had charge of the mine.

In the preparations which have been made looking to the resumption of new and active operations, a great deal of retimbering had to be done both in the mine and shaft. Many of the old timbers have decayed or are weakened by the pressure of the earth, and have consequently been replaced by new material. New rollers have also been put in throughout the mine, and in every section of it there has been a thorough overhauling of the material, and everything has been put in splendid shape and condition.

Mr. Baldwin, the new superintendent, has worked like a beaver since he assumed the management of the mine a few weeks ago. He found matters in rather a chaotic state on his arrival here, with the machinery scattered along the road between here and Winnemucca, and much time was unavoidably consumed in having it forwarded to the mine.

The South Chariot Mine is at present employing 32 men, and looks better than ever before. Between the sixth and seventh levels stopping is going on at a point 450 feet north of the shaft, where the vein is from 1 to 2½ feet wide, well defined, and producing fine milling-ore, with every indication of continuing just as good to the Minnesota line, which is 150 feet further north. This body of rich ore pitches down through the seventh, eighth, and ninth levels, at an angle which brings it within 115 feet from the shaft on the tenth level, where it was struck by running a cross-cut 24 feet long from a drift which, for some unknown reason, was run by a former superintendent through solid granite, almost parallel to the ledge. In the tenth level the vein is larger and richer than in the levels above, the ore showing considerable native gold and silver. The tenth level south will be run into that of the Mahogany, whereby both mines will secure good ventilation. Drifting has been commenced from the cross cut in the eleventh level, and in the cross-cut now run for the twelfth level the same 2-foot vein as in the tenth is expected to be found. A winze sunk from the ninth to the tenth level in September showed the rich ore all through. It will be seen from the foregoing that north of the shaft in the South Chariot a rich body of ore exists, having the shape of a trapezoid, the upper and lower sides of which are 150 and 535 feet in length on the sixth and tenth levels, respectively. Allowing the vein to average 1 foot in thickness, and reckoning 12 feet of solid quartz to the ton, we find that this body of ore will produce 10,552 tons; and estimating that it will pay \$40 a ton, (a low estimate,) we have a yield of \$442,080 from ore now in sight.

The Mahogany owns a claim of 900 feet, which is opened by a shaft 1,000 feet deep. Down to the seventh level the ore has been stoped out. The eighth, ninth, and tenth levels have been driven 500 feet from the shaft in good ore, and winzes sunk between the two latter, showing

good ore all through and effecting fine ventilation. In the bottom of the shaft the vein is 4 feet wide, and a correspondent of the Mining and Scientific Press estimates the ore in sight at 15,000 tons, averaging from \$40 to \$70 per ton. Before the financial crisis the Mahogany employed over 100 men. Then the company became heavily involved by the failure of the Bank of California and the disappearance of an agent with about \$75,000 of its funds. An assessment was levied; but a portion of the stockholders refused to pay it, and instituted suit against the directors on account of alleged fraudulent transactions in buying, for a large amount of money, an adjoining piece of ground, which is claimed to be almost worthless. When the company owed the hands three months' wages the latter became exasperated, forced the superintendent to shut down, and, for a short time, even forbade the hoisting of water from the mine. Up to the close of the year no settlement had been made.

The Silver Cord employed 30 hands, and had its shaft sunk down to the fourth level. New hoisting-works were to be erected, when the crisis came and stopped all operations, which have not yet been resumed.

The War Eagle worked from 15 to 40 men last summer, but is now shut down.

The Ida Ellmore has likewise not yet resumed work. During the summer it employed 35 men. Winzes have been sunk from the eleventh to the twelfth, and from the latter to the thirteenth level, for ventilation. Drifts were being driven ahead on the twelfth and thirteenth levels, and about 100 feet more will have to be run before the ledge can be touched.

The Poorman had to suspend work a while, but made satisfactory arrangements with their men, and resumed work with a dozen hands. There is a good body of ore in the mine.

In the Pauper a fine body of very rich ore was struck in the third level, which runs 400 feet south and 112 feet north of the shaft. In the fourth level the same body was struck 4 feet wide. Stopping was going on between the second and third levels, the richest ore being sacked for shipment to Winnemucca, the second class being piled up on the dump, when the crisis forced this mine to shut down, in spite of the excellent prospect ahead. Two lots of ore, making together 4 tons, were shipped to Winnemucca. One lot yielded \$448.21 in gold and \$209.46 in silver, the other \$105.48 in gold and \$104.61 in silver, per ton. Work has not yet been resumed.

In the Illinois Central the shaft has attained a depth of 445 feet, the ground being opened by four levels. The first level is 145 feet below the surface; the other three are 100 feet each deeper than the preceding one. Most of the ore above the first level was stoped out by Sands & Co. previous to the incorporation of the mine. The second level is in 150 feet north and the same distance south; the third level, 100 feet north and 60 feet south; the fourth level, 30 feet north and 35 feet south from the bottom of the shaft. There are four winzes, viz: one from first to second level, 150 feet south of the shaft, there being yet 23 feet to sink to make connection; one from the second to the third level, 50 feet north of the shaft; another from the second to the third level, 60 feet south of the shaft; and the last from the third to the fourth level, 50 feet north of the shaft, 12 feet remaining to be sunk to complete the connection, which will afford excellent ventilation for the mine. Fifteen men were engaged in underhand stoping from the top of winze No. 3, in the third level, and back stoping had also been commenced at the bottom of winze No. 2, in the same level, in the summer. The rich ore-body extends 150 feet in each direction from the shaft, and it is known to exist to the bottom of the fourth level, a distance of

300 feet. Allowing a cubic foot of quartz to weigh 166 pounds, there are now 11,205 tons of ore in sight, which, it is estimated, will mill at least \$75 per ton, or a total of \$840,375. How much deeper the ore-body extends is, of course, not yet known; but the fact that the lode has increased in size and richness as depth has been attained, taken in connection with what is already in sight, augurs a bright future for the Illinois Central. The character of the ore appears to change the deeper it is worked. In the fourth level it is dark-colored with copper stains, and very much like the rich ore formerly taken from the Golden Chariot and Ida Ellmore. There is no trouble on account of water, the mine being dry throughout. Even from the bottom of the fourth level it is not necessary to hoist more than two bucketfuls of water a day. A little more water, indeed, would be not unwelcome, since the water for the hoisting-engine has to be brought through a flume 1,600 feet long, from the War Eagle Mine.

In August the erection of new hoisting-works was completed, and in all quarters it was confidently expected that the mine would produce a large amount of bullion, the superintendent claiming to be able to produce 30 tons of ore per day; but the crisis came, and this company also succumbed, and nothing is going on now.

The Belle Peek has been steadily worked with good success, and a body of remarkably rich ore has been struck in the second level, the best of which, showing a large amount of native gold, is estimated as high as \$500 per ton. The shaft is down 150 feet, and the second-level drift extends 40 feet north and 35 feet south of the shaft. In both ends the ore is apparently equally rich, though gold predominates more in the north end and silver at the south. So far only a few hands have been kept at work, but the owners will now push developments ahead as fast as possible, and increase their force in proportion.

Several new claims have been worked on a limited scale, among them the Potosi, Lorraine, Glenbrook, Chipmunk, Crown Point, and others.

The bullion-product of the mines for 1875 was about \$225,000, against \$620,000 for 1874.

South Mountain district. — South Mountain is at present a "dead camp." The financial crisis which so seriously crippled mining operations in Silver City, proved altogether too much for the South Mountain Consolidated Mining and Smelting Company, and with the company the whole camp went down, because its prosperity solely depended upon that enterprise. The causes for such an utter failure are several. From my South Mountain correspondence I condense the following :

The company made large expenditures, probably larger than the exigencies of the times warranted. The mines, though first class, were undeveloped; much dead-work had to be done, and they could not be expected to be at once self-supporting, with such a heavy outlay for necessary improvements. The levying of an assessment (the first one) became necessary, which was a serious disappointment to stockholders, since glowing accounts of the excellent prospects ahead had been sent to them, which made them look rather for dividends than assessments. To make matters worse, the Bank of California failed just before the assessment became delinquent. This produced a panic-like consternation, and lack of confidence in mining circles all over the coast, and made money very tight. The action of the miners on War Eagle Mountain in shutting down the mines, when the companies for several months failed to pay off their hands, was imitated here; but while the miners of South Mountain cherished the hope of forcing the company to fulfill its obligations to them, they only succeeded in scaring the stockholders still more, and demoralizing them in such a manner that they refused to pay the assessment, which made the entire suspension of work unavoidable.

These were undoubtedly some of the main causes of the general collapse, but further on the correspondent exonerates the management

from all blame. Other parties, however, have adopted a different conclusion, which is largely shared by the public in San Francisco. Large amounts of money have been made by speculating in this stock, though the stockholders got nothing.

South Mountain was run up as high as \$13 in the spring, when no results at all had yet been obtained, only to tumble down to nothing by the time the continuity and richness of the mines had been proved. A management which causes or permits such artificial fluctuations in the figures which are supposed to be the index of success, cannot expect to enjoy much confidence in times of real or reported peril. The operations at the works were curiously ineffective. Most of the ores of South Mountain district are of an exceedingly favorable character for smelting, and besides this, they are usually rich, producing argentiferous lead containing from \$400 to \$550 per ton in silver and lead, as tested by Mr. Wolters. There is an abundance of the finest hematite for fluxing; the lodes of the company have always furnished a steady supply of ore, which varied very little in its composition, thus offering the great desideratum in smelting operations, namely, uniformly-composed charges; the furnaces in use are substantially built and well adapted to the treatment of the prevailing kind of ore. If, therefore, with all these facilities it proved impossible to keep a furnace running longer than a week, when it ought to make campaigns of at least six or seven months, there must have been something wrong in the management. The permanent excuse, that the water-jackets burst, cannot be accepted, water-jackets correctly constructed and treated having no occasion to burst. Besides, if it was impossible for the men in charge to work them successfully, any ordinary manager ought to have been able to run his furnaces without them.

The reason that the whole camp instantly collapsed when the Consolidated Company stopped operations is found in the fact that the latter possessed the only reduction-works in the place, and owned at the same time a number of very productive lodes, abundantly able to supply their works to the full extent of their capacity. The company cannot now afford to do custom-work or purchase ore; and hence the outside mine-owners, being nearly all men of small means, are prevented from working their mines until they are given a market for the product. It is said, moreover, that capitalists have been deterred from investing in the mines by the belief that the company owns all the good lodes in the camp. The fact is, however, that, although the Consolidated Company owns some of the best lodes of the camp, there are many others at least equally good and able to produce the same quantity and quality of ore as any one mine belonging to the company can furnish.

Of the 800 inhabitants claimed by the camp in the days of its greatest prosperity a mere handful is all that is left, but the present state of affairs cannot possibly last long. The mines of the district possess as much real merit and value as those of any other silver-lead camp on the coast; the greater part of the ores raised fulfills every condition for successful and easy treatment by smelting; they are further unusually rich, averaging probably not less than from \$60 to \$75 per ton; and all that is needed to make South Mountain prosperous and productive is the establishment of works honestly and skillfully conducted, where the product of all the mines may find a ready sale at any time at fair prices.

The town of South Mountain is located about 26 miles south of Silver City, at the head of South Mountain Creek, and though only a little

over one year old at the time of Mr. Wolters's visit, presented a respectable appearance. It is picturesquely situated, but being jammed in between high and steep mountains on three sides in a small valley not exceeding 300 feet in width, can command little room for growth without laying out streets on the side of the rather steep hills. The creek furnishes deliciously clear and cool water, sufficient for household and milling purposes, but not for motive-power. Timber is scarce in the immediate vicinity; but on the other side of the mountain, five to six miles northeast of the town, there is a large amount of fir, which makes tolerably good lumber.

Mr. Con. Shea has erected a saw-mill there. All the charcoal needed for the furnaces has to be packed a distance of ten miles at a cost of ten cents per bushel, from the nearest place, where juniper is found in almost unlimited quantity. The cost of living is not very high considering the recent origin of the camp and the absence of ranches in the vicinity; board is \$9 per week; rough lumber \$50 and clear lumber \$100 per thousand; wages for miners are \$1 per day. Large quantities of lumber are hauled from Boise City, a distance of nearly 90 miles, since the only saw-mill near the camp is unable to meet the demand.

The lodes are grouped around the upper end of town. Most of them have been described in a former report by Mr. Eilers, but, for the sake of completeness, I will recapitulate briefly on this occasion.

The Golconda is located on the north side of the town. Twenty-three feet north of the point of intersection of the lode by the cross-cut tunnel a shaft has been sunk to the depth of 125 feet. The lode is here 8 feet wide and carries from 2 to 6 feet of ore, a good deal of which by proper assorting will make tolerably good smelting-ore, while the balance consists mainly of pyrites and zinc-blende. The average ore contains from \$30 to \$35 silver per ton and 15 to 20 per cent. of lead. This lode when properly opened can furnish a very large amount of ore, but, like that of other lodes close by, it is of inferior quality for smelting.

A short distance above is the Original lode. It is very large, but so far carries ore in small seams only, and of very low grade.

Further up the hill are the Galaxy, Jessie, Mono, and Disappointment, all opened by shafts from 40 to 100 feet deep, and having each from 20 to 100 tons of excellent smelting-ore on the dumps, mostly very rich-looking carbonates.

Below the Golconda is the property of the Hastings Brothers. They have run a cross-cut tunnel 200 feet long, which passes through three lodes. The first one, called the Black Giant, is a very large lode, being 60 feet wide, with streaks of ore distributed through the whole width of the crevice. The lode, where struck, is considerably broken up, the ore resembling that of the Golconda. The other two lodes are 3 feet wide each, but not developed. Another tunnel is now being run which will strike the lodes 50 feet deeper, where they will probably be more solid.

The Crown Point, on the hill opposite the Golconda, carries a good body of ore, similar to that of the latter, but somewhat richer in silver and lead. Very little work has been done on it.

On the mountain southwest of the town are a large number of fine lodes, all occurring in limestone and mica-slate, while the opposite ridge nearly down to the Original is formed of granite.

High up on the first-named ridge is the Independent. It has a shaft 60 feet deep, only the upper 25 feet being on the vein, which here slides.

to one side, while the shaft continues straight down. There is some very fine gray carbonate of lead, 2 to 3 feet wide, in the lode, and a large amount of ore on the dump. At the time of Mr. Wolters's visit it was intended to recommence work on this vein, but owing to the general crash the plan was not carried out.

Next below comes the Bay State, one of the best lodes of the camp. Like nearly all the others, it runs nearly northeast and southwest and dips 78°. The shaft is 148 feet deep. At a depth of 90 feet a level has been run northeast 30 feet, and from the bottom another level extends 378 feet southwest, the heading being 159 feet below the surface. The company intended to sink another shaft several hundred feet southwest next spring, and to keep the old one for an air-shaft. New hoisting-works, driven by a 12-horse-power engine, were being erected while Mr. Wolters was in the camp.

About 100 feet lower down the cañon, and running parallel to the Bay State, is the Yreka lode, formerly known as the Numkeg. It runs northeast and southwest and dips 46° southeast. A drift has been run in on the lode at the discovery. It was last summer about 250 feet long. A winze was being raised 50 feet from the heading and stoping was done both ways on a body of ore varying from 10 to 30 inches in thickness, the crevice being from 4 to 6 feet wide. The ore is principally galena, but contains also a considerable amount of lead-carbonate and hydrated oxide of iron. From the 90-foot northeast level in the Bay State a cross-cut 83 feet long has been run, tapping the Yreka about 180 feet below the mouth of the upper level, and thence following the vein southwest for a distance of 360 feet. In this level the crevice is 12 to 15 feet wide, with 1½ to 6 feet of ore. The latter is raised from this level through the Bay State shaft. The lode can produce about 30 tons of ore a day, sufficient to keep one of the company's furnaces supplied. There were 30 men employed here before the stoppage.

Further down are the General Grant and Robie lodes, both containing strong bodies of good, and some very rich, ore. Very little work has been done on them. Mr. Don Vincent is running a tunnel, which will be completed during the winter, and will strike the lode 100 feet from the surface.

At the close of the year the only work going on was done on the Hastings property, the Polar Star, and the Robie.

A considerable excitement was created during the spring by the discovery of some very promising mines near Wagontown, about 6 miles south of Silver City. The lodes are generally very strong, averaging from 4 to 7 feet in width, with ore-zones from 1 to 3 feet thick, well-defined walls, and the general appearance of first-class veins. The ore is flinty quartz, with ruby silver and silver-glance and some gold. Silver largely predominates. The richest ore, worth probably several thousand dollars per ton, has been produced by the Henrietta Mine. Several lots of it were shipped to Winnemucca, but I have not learned the result. From the Saint Clair, one of the largest and best-defined veins, several lots of ore were sent to Silver City, yielding from \$70 to \$80 per ton.

The Maggie has been lately incorporated, and bears as high a reputation as any mine in the district. Next year will certainly witness great activity here, since the "prospects" are extraordinarily good; this fall no lode was explored beyond 100 feet in depth. If Silver City does not do better next year than the past one, and Wagontown should become possessed of good reduction-works, the former may have trouble to maintain its leading position as a bullion-producing camp in this county.

LEMHI COUNTY.

It is reported that some good lodes have been found in this as yet rather inaccessible county, but I have not obtained any reliable data in regard to them.

In conclusion, I wish to acknowledge the valuable assistance rendered to Mr. Wolters by Mr. W. B. Morris, agent of Wells, Fargo & Co., and Mr. R. Heuschkel, of Boise City; Messrs. McNally, Newton, Hopkins, Pfeiffer, Anderson, and others in Rocky Bar; Allgewahr, Lantis, and Tillmar, of Atlanta; Coughanour and Mootry, of Quartzburgh; Leland, of Warren's, and Irwin, Wessels, and Cook, of South Mountain.

CHAPTER IV.

OREGON.

From the western part of the State, I have nothing to report in the way of important developments. The coast-diggings in Northern California and Oregon continue to be the objects of fitful enterprise, but I have heard of no undertakings in that quarter which require further mention than has already been given to the subject.

In Eastern Oregon the winter of 1874-'75 was unusually severe. Only the Indians and the former trappers of the Hudson's Bay Company could recall instances of equally inclement seasons. The mercury stood between zero Fahrenheit and 26° below for a period of two months. Such temperatures are not favorable to heavy snows, or perhaps it would be more rational to say that heavy snows would have moderated the weather. Yet the aggregate supply of water, if I may judge from the general reports from the diggings, does not appear to have been seriously deficient. My valued correspondent, Mr. E. W. Reynolds, of Baker City, informs me that the product of gold-dust came fully up to the yield of 1874, while the Sparta and Gem City diggings, in Union County, tributary to the Eagle Canal Company's ditch, were more productive than in the preceding year.

Powder River Valley.—The gulches along the western slope of this valley have paid about as well as usual. Messrs. Andrew Smith & Co., in Washington Gulch; Daniel Carn, in Ruan Gulch, and McCord & Co., in the same locality; Nelson & Co., on Salmon Creek; Crow & Balger, Dare, Kelly, and others, back of Pocahontas; and Ingraham & Co., farther down the valley and on Wolf Creek, are reported as operating with average good results. In Ruan Gulch, McCord & Co. struck during the summer a small vein of very rich gold-ore, which they propose to develop this year.

Conner Creek.—On this creek, an Oregon tributary of the Snake, is located the old Conner Creek gold-bearing lode, now owned by Messrs. White, Myrick, and others. These parties are employing 15 stamps, 10 being driven by steam and 5 by water. They are reported as "doing well." The extension of the Conner Creek claim, operated by Messrs. Sleeper & Co. with the aid, it is said, of eastern capital, employs, apparently with profit, a 5-stamp water-mill, to which it is intended to add 5 stamps this season.

There are also placer-mines in this neighborhood. Mr. O. Hinckler has two ditches, aggregating 1½ miles in length, which take water from Conner Creek and command the Snake River bars. They carry from 50 to 100 inches the year round. The ground covered by this supply is worked with Chinese and white labor by the proprietor of the ditch, who is able to make advantageous use of all the water, and consequently has none to sell.

In *Fox Creek*, 1 mile above Conner Creek, Messrs. Speake & Packer have a ditch, carrying from 50 to 200 inches of water, all of which is utilized by the proprietors.

At *Soda Creek*, 6 miles below Conner Creek, a ditch 1½ miles long, carrying from 30 to 100 inches of water, is owned by Messrs. Ross, Pitts

& Co., who own also and work to the extent of the water-supply the ground commanded by the ditch. Across the Snake River there are spots which would pay well for working, if similar water-facilities were provided. The bars are from 3 to 30 feet deep, and run back to the hills.

In *Shirt-Tail Gulch*, on the way from Burnt River to Rye Valley, the Lam Davis lode is said to promise well, "prospecting" from \$10 to \$40 per ton in gold.

Rye Valley district has been retarded in its development by unfortunate dissensions and litigations, by reason of which the fine mill of Green, McDonald & Co., which was formerly run, it is said, with profit, has been standing idle. It is expected that a settlement of difficulties will be reached and a renewal of industry facilitated during the present season.

Granite Mountain district is making but slow progress, though the prospectors and mine-owners do not abate their high opinion of its numerous gold and silver bearing lodes.

Humboldt Basin, Clark's Creek, and the little camps along Burnt River are doing about as they did last year.

Auburn still holds out, with a moderate production. The Marysville Company, a California corporation, owning the Blue Cañon flume, will probably increase, with its ditch now in progress, both the extent and the duration of profitable mining in this well-known camp.

New discoveries of rich gold and silver lodes are reported from Fort Sumter and Granite Creek.

Near Baker City, the Virtue Mine (referred to in former reports) is still the principal enterprise. Mr. Hyde, the efficient superintendent, reports the extraction of 4,500 tons of ore during the year, worth about \$108,000, or an average of \$24 per ton. This estimate of values is considered too low by some competent outside observers. The ore came from all parts of the mine, which is now 500 feet deep. A new shaft is being sunk with Burleigh drills above the old Buckle main tunnel. It is intended to carry this shaft to the lowest workings, and hoist all ore through it. It will be done by June, 1876. There are 50 men employed at the mine. Wages, \$4 per day. Under Mr. Hide's management, the property is said to be earning profits.

The James Gordon Company, working the mine of that name, $\frac{1}{4}$ miles east of Baker City, took out last year 71 tons of quartz, which, being treated in a custom-mill, yielded nearly \$1,900 after paying expenses. The bullion is very fine, being worth \$18.50 per ounce. The company is preparing to work on a larger scale.

The Ironstone Mine has a tunnel 80 feet deep. The deepest point attained is 75 feet below the surface. The vein is gold-bearing; width, 3 feet; country-rock, granite; prospects encouraging.

Baker City has been damaged in business prosperity by the failure of Mr. Virtue, a leading banker. But the town is growing, and will doubtless maintain and increase its importance as the business center of Eastern Oregon.

Shasta mining-district, (El Dorado, Malheur, and Amelia.)—Packwood & Carter have completed about 33 miles of new ditch since May, 1874. Their main ditch is now about 135 miles long, 7 feet wide at top, 5 feet at bottom, and 2 feet deep. The net profits of the season are said to have been over \$14,000. From the condition of the ditch at this time, water-sales are expected to reach \$50,000 to \$60,000 this year, and expenses to be about \$10,000. About 200 men, both Ohinamen and white men, worked last year under the Packwood & Carter ditch. The water-supply was from 1,000 to 1,500 inches for ten hours, at 20 cents per

inch; wages earned by Chinamen, \$2 to \$2.50 per day; by white labor, \$3.50 to \$4 per day. The gold-yield was not less than \$150,000. The mining-season did not begin till about July, owing to the vast amount of work required to put the ditch in good working order; which had never been done heretofore. The ditch is now an assured success, and promises to be a dividend-paying institution for years to come. It is probably the greatest private enterprise ever begun and carried to a successful termination in Oregon. It has been twelve years in progress. The area of the mining-camps commanded by this ditch is larger in extent of territory than what is called "the Black Hills Country" in Wyoming. It is asserted that not a failure has occurred in placer-mining in the ground supplied with water by this ditch. The price paid for water in hydraulic "heads," namely, 20 cents per inch for 10 hours, measured by a 2-inch opening and 4-inch pressure-board, is certainly profitable enough to the ditch-owners; and the fact that it can be paid speaks much for the productiveness of the placers.

Hog'em district.—The Summit Gold-Quartz Mine, owned by Packwood & Stewart, remained idle, on account of "hard times," from June to fall. Since that time Morgan Keltner has been running the mine and mill at times. The latter is a 10-stamp steam-mill, and when running at full capacity crushes from 10 to 14 tons every 24 hours. Some 400 tons of quartz crushed during the season yielded about \$12 per ton. It is Mr. Packwood's intention to move the mill to Eagle Creek, distant from the mine about $1\frac{1}{2}$ miles, and run it by water-power. The mine is now about 350 feet deep. The vein varies from a few inches to 4 feet in thickness. All the quartz is worked without assorting, and will average from \$10 to \$12 per ton without saving anything from the iron-pyrites, which is said to be rich. The rock is easily taken out, no powder having been used so far on the lower 150 feet. With water-power at the mill and hoisting-works at the mine, it is believed that \$6 rock will pay expenses. The upper stopes have been worked for a length of about 600 feet on the vein, and to a depth of from 50 to 100 feet. In this part of the mine the vein varied very much in size, averaging about 15 inches of decomposed quartz, and yielding as high as \$60 per ton. The average of nearly 3,000 tons was between \$20 and \$25 per ton. The present sinking on the mine has been going on for nearly two years on what appears to be the central shoot or "chimney." From this body, below the upper works, about 1,000 tons have been worked, yielding about \$12 per ton, the average size of the vein being between 24 and 30 inches. There is now a large amount of quartz in sight in this body, which, so far as developed, in length seems to extend about 200 to 225 feet along the lode. From this the north shoot seems to be divided by a vertical pinch, in which the walls close together, leaving only a small seam. This north shoot has been opened to a depth of 200 feet. The south shoot and the mine farther south have been prospected and traced for about 1,000 feet in length, but no quartz was obtained which yielded in the mill more than \$10 to \$12 per ton. At the depth of present workings, this vein carries a black-clay "gouge" on the foot or the hanging wall, sometimes nearly one foot in thickness. Large quantities of bright iron-pyrites are found in this clay. The walls in the lower workings are from 3 to 10 feet apart, and appear smooth and polished where the "gouge" is broken off. Mr. Packwood has been four years developing this mine, and deserves great credit for the energy with which he has persevered both in this enterprise and in the still more important and generally beneficial work of the construction of the El Dorado ditch. He intends to have, as soon as practicable, a 20-stamp mill, with pans for the treatment of the pyrites.

CHAPTER V.

MONTANA.

Mr. William F. Wheeler, of Helena, has collected the materials for this chapter, with the assistance of a number of gentlemen residing in the Territory. From his reports on the several districts, it is evident that quartz-mining is on the increase all over the Territory, while the yield of placer-mines is slowly diminishing each year. More retort gold from arrastras and small stamp-mills has been sold in 1875 than ever before, and less dust from placer-mines.

The number of tons of silver-ore worked and shipped in 1875 is very nearly double the quantity worked and shipped in 1874. By the Missouri River about 2,000 tons were shipped, and by the Union and Central Pacific Railroads about 1,000 tons; the average value was \$250 per ton, or total \$750,000. Refined silver bars by express, value \$88,000.

Of copper-ore, 150 tons were shipped, the average value of which was \$150 per ton, or \$22,500 in all. The copper interest is growing; and while the shipments in 1875 were experimental, the result has been so far satisfactory that they will be continued; but the ores will be more closely assorted hereafter, and only those of a higher grade will be shipped. The almost uniform experience of working our copper-veins has been to demonstrate that the veins improve in width and richness the deeper the shafts are sunk. At a depth of from 80 to 100 feet, several of them now show ore that will average 50 per cent. copper, though near the surface the same openings yielded ore carrying but 25 to 33 per cent. The lodes of copper are abundant and the veins from 4 to 100 feet in width. Several smelters are in course of construction to reduce these ores to ingots at home.

Two mills for working silver-ores have been constructed at Phillipsburgh, or so improved as to make them new. The mill of the Northwest Company, at Phillipsburgh, running 10 stamps and using Bruckner cylinders for roasting, has uniformly produced from Speckled Trout ores about \$9,000 per week. The mill of the Saint Louis Company, working Hope and other ores, running 10 stamps and using reverberatory furnaces, produced from \$6,000 to \$7,000 per week. These results are very uniform, and are expected to be still greater in the course of the next year, since the numerous leads in the close vicinity of the mills will insure an abundance of good ore.

A small one-stack smelting-works, owned and run by William Nowlan, has been very successful in reducing the galena-ores near Jefferson City, in Jefferson County. It is run by water-power, and is inexpensive in its working and profitable in its results. More smelters close to the mines will be erected during the next year.

Taking the Territory as a whole, more arrastras and small and economical quartz-mills are running than ever before, and with almost uniformly profitable results, while many large and expensive mills, erected in early days, are standing idle for want of sufficient ore in their immediate vicinity to supply them. The miners have learned by said expe-

rience to adapt the capacity of their mills and machinery to the known productive capacity of their veins. It may be hoped that few mistakes of excessive mill-building will be made hereafter.

Mr. Wheeler estimates the yield of gold, silver, and copper during the year 1875 as follows :

Gold shipped by Wells, Fargo & Co.....	\$2, 235, 600	
Gold-dust and bullion by other conveyance....	500, 000	
Total gold*.....		\$2, 735, 600
Refined silver-bars, shipped by Wells, Fargo & Co.....	88, 000	
Silver-ores shipped, 3,000 tons, at \$250	750, 000	
Total silver.....		838, 000
Total gold and silver.....		3, 573, 600
Copper-ores, 150 tons shipped, at \$150.....		22, 500
Total gold, silver, and copper.....		3, 596, 100

The above Mr. Wheeler gives as the actual amount realized ; but at the close of the year there were more tons of silver and copper ores at the mouths of the mines prepared ready for shipment, of equal average value per ton, than were shipped during the year ; and 100,000 tons of ores, running from \$40 to \$150 per ton, that will not bear shipment, are piled by the dumps for future working, or awaiting cheaper transportation.

The shipments of ores in 1876 will be limited by want of transportation. If every wagon that brings freight from the railroads or the Missouri River were to take out an equal tonnage of ores, (say about 8,000 tons,) they could not transport the amounts that could be ready for them. This want of means of shipment, and the other want of mills and smelters to reduce the ores at home, prevent the actual working of all but the best mines, and put a limit to their yield.

The demand for more freighting facilities has considerably raised the cost of exporting ores, and the competition has given the monopoly of export-freights into the hands of those who are able to buy the ores, or to make contracts with freighters for the whole season. This enables capitalists to buy up the richest ores of men who produce but comparatively few tons, by their own labor on their own mines, at a price that gives but little profit to the producer. This is a natural consequence and discourages production.

As evidence of the above statement, Mr. Wheeler mentions two claims owned by wealthy men, whose owners have already contracted for the shipment of 500 tons of ore from each, while poor men, owning just as good claims in the vicinity, are unable, for want of money, to ship their ores at all, and are compelled to sell at the purchaser's own price. A remedy is hoped for in railroads, or the improvement of the navigation of the Missouri and Yellowstone Rivers by help of Congress, for which the legislature has forwarded a memorial.

Placer-mining.—As before remarked, the yield of the placer-mines has

* Mr. Wheeler adds another \$500,000 for the amount retained in the hands of miners, an allowance which I have assumed to be counterbalanced by a similar amount mined the year before, but included in the shipments this year.—R. W. E.

slowly and steadily decreased for the past six or eight years. The reasons were given in my report of 1874, page 327. Yet there are causes now at work which will in a short time increase their yield, or at least arrest its decline. These are the consolidations of small claims into one ownership or company. Ability is thus acquired to bring in longer and larger ditches, and more water from the large streams. Capitalists are taking up or buying large tracts of mining-ground which could not be worked heretofore for want of water, and building large, long, and expensive ditches to work them. The days of narrow, rich gulches and bars, and short, inexpensive ditches are past, and with them the chances of the "lone and lucky" miner.

Dear Lodge County, as for some years past, has continued to yield more placer-gold than any other, the amount being about \$900,000 for the year. Old Alder and other gulches in Madison give about \$450,000. The placer-mines at Bannack and vicinity produce about \$300,000; the mines of Cedar Creek and Quartz Creek, in Missoula County, \$100,000; those of Confederate Gulch and the numerous gulches and bars in Meagher, about \$300,000; those of Gallatin County, \$50,000; those of Jefferson, \$150,000; and those of Lewis and Clarke, \$350,000; or, a total of about \$2,400,000. The remainder of the gold-yield is from arrastras and quartz-mills, and amounts, according to Mr. Wheeler's estimate, to about \$800,000.

At Helena, Mr. Chessman, the owner of the several ditches, is putting down a bed-rock flume, to run up from Ten-Mile Creek four or five miles, so as to drain the bed-rock of the celebrated Last Chance Gulch, on which Helena is built. Seven or eight millions of gold have been taken out of this gulch, and for a great part of its length bed-rock has never been reached, owing to the depth of the gravel and to the water, which rose so as to prevent sinking to bed-rock. It will probably be completed this coming year. Three or four thousand feet of fluming were put down this year, commencing at Ten-Mile and extending up the gulch. After the water has done its work of washing the dirt for the mines at the upper end of the gulch, it will be used next season in cutting down and carrying away the gravel through the flume, so that it can be extended next fall on the bed-rock up the gulch. Mr. Chessman has bought two farms on Ten-Mile for dumping purposes. It is believed that when the flume is completed along the bed-rock of Last Chance, the former prosperity of the gulch will return, and it will yield millions more of gold. I give this as only one instance of what will be done in the future where capitalists or companies own the ground and the ditches, and as what could never be done by single owners of small claims.

BEAVER HEAD COUNTY.

This county, situated in the extreme southern portion of the Territory, is rich in deposits of the precious and useful metals. Gold, silver, copper, galena, zinc, manganese, and iron have been found in every quarter of the county. Sandstone, limestone, granite, trap, and quartzite crop out on every mountain and hill. Lignite, shale, stone-coal, and fire-clay are in place in various localities. The extensive mountain-ranges, covered with dense pine forests, are varied on each side by rolling foot-hills, and clear mountain-brooks, creeks, and rivers traverse the county from south to north.

Since the first settlement of Bannack, in 1862, not less than three millions of dollars' worth of the precious metals have been taken out, principally from the placer-mines. There have been constructed about

90 miles of water-ditches, at a cost of about \$110,000. These ditches convey the water to the placer-mines at Bannack, Horse Prairie, Argenta, Bald Mountain, and Wisdom River, which are still actively worked, yielding handsome returns, especially the Horse Prairie placers, which are now extensively worked by Chinamen, who have paid, and are yet to pay, large sums of money for their mining rights, and can now employ 75 to 100 hands. There are probably about 25 white men who own important claims in that locality and are earning fair profits from them.

The placer-mines at Bannack, Bald Mountain, and Big Hole, or Wisdom River, cover considerable areas, and are likewise reported to be profitable to their owners and operators.

According to the most trustworthy information, the gold yield of the past year is estimated at \$200,000, and the value of the silver-ore sold and shipped at the same amount, thus giving the total gold and silver production of this county of \$400,000. This is said to be a low estimate.

The prospects of mining in this county appear very favorable when it is considered that the placer-mines will continue to be productive for many years to come, and that the numerous silver, gold, and copper veins are yet undeveloped, to say nothing of the large deposits of iron-ores.

Bannack district.—The first veins of gold-bearing quartz discovered in the Territory were located in this district. Exact statements of the quantities and yield of ore worked in the district during 1875 are not attainable. The following summary of operations, though general in terms, is believed to be trustworthy. Messrs. Philip Shenan and John Carhart were the principal operators in gold-veins last season, running their mills on quartz from the Dakota, Excelsior, and other veins. Mr. Shenan has developed and patented a number of valuable mines, among which are the Excelsior, Waddams, Springfield, and Gold Leaf. In some of these other parties are interested with him. Mr. Shenan is the owner of the somewhat famous Dakota No. 6, which once belonged to New York parties, but proved unprofitable under their management. It now has a shaft 310 feet deep, and yields rock which, at the present time, is worked with satisfactory results. Mr. Shenan took out, with a 5-stamp mill, during the past season, \$75,000 in gold, from the quartz of the Dakota and Excelsior lodes, a product which, though it might easily fail to cover all the expenses of an absentee company, leaves a reasonable income for a private proprietor.

Mr. Carhart is the owner of Dakota No. 7, and has run his mill on Dakota ore, doing, besides, a considerable amount of custom-work. No. 7 is yielding a good supply of rich ore, and Mr. Carhart's prospects for the future are flattering.

Messrs. Shenan & Waddams worked ore from the Waddams lode on three arrastras, netting \$5,000 for the season. The ore from the Saint Paul also was reduced by the owner in an arrastra.

Mr. Shenan is driving a 300-foot tunnel to tap the Hope lead at the depth of 200 feet, and is reported to be extracting already very rich ore. He is also sinking a shaft on the Poor Prospector's lode, and taking rich oxidized ore, which is said to average \$500 per ton. He is also taking out considerable quantities of ore from the Excelsior. The ore has changed from the oxidized condition to sulphuret of iron, carrying gold.

Blue Wing district is situated from one to six miles northeast of Bannack. There are probably over one thousand argentiferous lodes re-

corded in this district. Most of them are in limestone, but a number occur in granite.*

But few of these lodes have been developed sufficiently to be called permanent mines. Only those which have been worked the past season or have been developed will be noticed here.

The Delmonte is in granite. The main shaft has been sunk to the depth of 230 feet, with levels 80 feet long on each side. The vein is of uniform width in the various shafts and levels, averaging six inches. The surface vein is black, decomposed silver-ore. At the depth of 100 feet the ore changes into ruby silver. Messrs. Peck & Bray mined and shipped 100 tons of this ore the past season, assaying \$300 per ton. The lode is well prospected 500 feet along its strike from east to west. The dip of the vein is slightly to the south. A. F. Sears and Clark Smith are the owners.

The Huron silver-lode, situated on a high limestone mountain, half a mile south of the Delmonte, strikes east and west, dips south, fluctuates in width from a foot to six feet. The ore is sulphuret and chloride of silver, and assays from \$50 per ton to several thousand. There are a number of shafts and levels on this vein. The deepest shaft is 80 feet. Large quantities of ore have been taken out of this lead and shipped or sold on the dump. The owner is Samuel Batchelder.

These two veins have contributed an important service to the district. When, a few years ago, all the furnaces in the county had failed of success and prospects were gloomy, and the miners themselves were ignorant as to the real value of this as well as the other silver-districts of the county, it was determined to make some conclusive test, and a small quantity of selected ores from these two veins was shipped to Swansea, in Wales. The venture returned a profit after deducting all expenses. This gave a new life to mining, and large quantities of ores were shipped to Germany and San Francisco, the result being largely in favor of the latter place.†

The development of mining and smelting in Utah, consequent upon the introduction of railroads, opened a new market for Montana silver-ores, far more favorable to the miners than Germany, Swansea, or California. The shipment of ores from this county has become an extensive and profitable business. There are now on the dumps in the various districts of the county more ores than can be shipped by wagons for the next year. A railroad into the county would greatly increase the value of the mining property in Blue Wing district; but this constitutes a small proportion only of the deposits awaiting developments in all quarters of the county, many of which appear to be capable of large production.‡

Black Hawk No. 2 is in granite, with smooth walls, now reported to be 7 feet wide; strike, east and west; dip, 85° south. The shaft is 275 feet deep. The ore at the surface is black, (stained with manganese,) but gradually changes into predominating iron-pyrites. The value of the ore is but little known. There are large quantities on the dump of \$40 or \$50 ore. This lead has been prospected for more than 2,000 feet along the course. J. O. Taylor, the owner, has purchased all the con-

* One of my correspondents calls this rock trap, but the reports of others and the probabilities of the case are against him.—R. W. R.

† See my report of 1874, p. 372.—R. W. R.

‡ But the transportation of ores out of the Territory is, after all, but a temporary and wasteful expedient. Their reduction at home will be the ultimate solution; and, as I have indicated in my report of 1872, the copper-ores of the Territory will probably furnish the most abundantly available material for a rational process.—R. W. R.

flicting interests on each side of his mine, among which are the two lodes—the Nodaway on one side, with a shaft 40 feet deep and well-defined vein of black ore $3\frac{1}{2}$ feet wide, and the Queen of the West on the other, with a shaft 35 feet deep, vein and ore the same. His plat covers, also, several other claims, with shafts from 10 to 30 feet deep, all in granite. Black Hawk No. 2 is probably better developed for permanent working than any other mine in this district. Mr. Taylor is now sinking 250 feet west of the deep shaft, with good prospect, having richer ore. All these veins contain a small percentage of galena and gold.

The Don Juan is owned by Messrs. Mead & Bassett. It has a shaft 65 feet deep, and another shaft, 40 feet deep, on the Luzerne, now supposed to be the same vein. This indicates a north and south vein, 4 feet wide, with a dip of 45° west, located on the line between limestone and granite. Twelve tons of this ore have been shipped, assaying about \$250 per ton. There are about 65 tons on the dump, one-fourth of which is shipping-ore. The ore is sulphurets and chlorides, with about 10 per cent. of galena.

The Bonaparte is located about 75 feet south of the Delmonte, on the line between limestone and granite. It strikes east and west, stands almost vertical, and is 3 feet in width; regular, with smooth walls. The ore is black, strongly impregnated with manganese, with a small percentage of silver and galena. The main shaft is 35 feet deep. There are 150 tons on the dump, of an average assay-value of \$35 or \$40 silver per ton. According to early assays, mentioned in my report of 1873, and apparently made on richer specimens, the ore contains gold also. The mine is to be deepened, developed, and tested next season. It is now owned by J. H. Larwill, William Peck, and E. D. Leavitt.

The Pomeroy lode, owned by A. Bassett, is in limestone. It is from 6 to 8 feet wide, and very prominent, the croppings projecting in some places 8 feet above the surrounding surface. The ore is generally free from base metals, and carries metallic silver. This claim is well prospected for 1,100 feet by ten shafts from 25 to 80 feet deep. About one-fifth of the ore is of high grade. Five tons shipped to Utah sold for \$250 per ton. There are not less than 600 tons on the various dumps. The average assay-value is about 30 ounces silver.

The True Fissure, a north and south vein, cutting off the Blue Wing lode on the west, was discovered during the past season by Mr. Wybold. He has sunk a shaft 80 feet deep. The vein is 3 feet wide. The ore is high grade, assaying from 100 to 200 ounces silver, and 25 per cent. lead. Some of this ore has been shipped but is snow-bound, as is also the last shipment made by Messrs. Peck and Steel, and a lot of bullion shipped by Dahler, Armstrong & Co.

The New Departure, owned by G. W. Stapleton, is in limestone on the verge of the granite. A tunnel 150 feet in length has been driven, tapping the vein at the depth of 100 feet. The main shaft is 150 feet deep. The vein is 8 feet wide, filled with clay, talc, and ore. The ore is of high grade, but the supply is irregular. Nine tons were shipped to the Bank of California, netting \$200 over expenses of shipping. The hanging-wall is smooth, often polished; the foot-wall is not defined. Further developments are in progress.

The Czar, owned by Clark Smith, has a tunnel running in on the vein 200 feet, the vein cropping in granite, and apparently running direct into a limestone mountain. The ore is black and oxidized and some of it is of high grade. On the surface it resembles the Delmonte ore. Improvements are in progress.

Charles Bowman is sinking on the Bismarck lode. The shaft is 80 feet deep and the vein is reported 3 feet wide, yielding about one-quarter of high-grade ore.

Mr. Batchelder is said to be taking very rich ore from the Great West, a vein in limestone.

Bryant or Trapper district.—This district was first brought to notice in August, 1873. About that time trappers brought to Bannack specimens of quartz, which, being assayed, proved rich in silver. The fact was communicated first to a limited circle, and soon the whole community was excited, and a stampede ensued.

About fifty lodes have been recorded, nearly all of which, so far as they have been developed, promise to produce a considerable proportion of ore rich enough for shipment—a severe test.

Bryant (or Trapper) district is situated due north from Bannack 35 or 40 miles. Between the two are Rattlesnake and Birch Creek districts. The rock in Bryant district is said to be wholly dolomitic limestone, the white mountains of which glisten strikingly in the sun. Some of the lodes are more than 10,000 feet above sea-level.

The Trapper lode was finally located on the 10th of August, 1873, by Jerry Grotivant, James A. Bryant, and others, who had gone into that region for the purpose of trapping and for pleasure, and, while hunting for their "cayuses" (Indian ponies) accidentally discovered the outcrop of the vein. The claim has been prospected for its entire length, (15,000.) The strike-vein is north and south; the dip at the surface was almost horizontal, but gradually turned in depth, until it assumed a nearly vertical position. The main shaft is 13 by 13 feet in size and 150 feet deep. The width of the crevice is uniformly 13½ feet. There is one tunnel 6 by 7 feet and 290 feet in length, connected with the bottom of the shaft. An ore-house is built at the mouth of the tunnel 32 feet by 26 feet. The ore is reported to be "rough, tinged with varied colors, and containing silver, copper, lead, zinc, antimony, sulphur, and manganese." In 1873 there was shipped to the Bank of California 10 tons, of which the assay-value returned was 140 ounces of silver per ton. In 1874, 101 tons were shipped to Freiberg, Germany, which assayed there 280 ounces per ton. In 1875, 300 tons were sold on the dump to Dahler & Armstrong, of Glendale, Montana, which assayed from 130 to 300 ounces per ton. Fifty tons of first-class ore remain on the dump and about 3,000 tons of second-class ore, valued at 80 ounces in silver per ton. Thousands of tons are said to be in sight in the mine.

The Dubuque lode, owned by Messrs. Terrel, Wilcox, and others, has one shaft 30 feet deep and one level 30 feet. The vein is 5 feet wide. Seventy-five tons were sold to Dahler & Armstrong on the dump, at an assay-value of 90 ounces per ton.

The Minnie Gaffney, owned by Owen Gaffney, has a shaft 60 feet deep, 6 feet by 7 feet, and a four-foot vein. No sale of ore has been made. There are 75 tons on the dump. An assay of sampled ore gives 40 ounces silver and 60 per cent. lead, and zinc, copper, antimony, and arsenic in various proportions. Mr. Gaffney is working eight hands at present.

The Lady Elgin, owned by Messrs. De Lorimer, Forney, and others, is but little developed. One shaft is 30 feet deep. The ore-vein is 18 inches in width. The assay-value of the ore on the dump is 50 ounces silver per ton.

The Forest Queen is owned by Messrs. Keppler, Graster, and others. The vein of ore is 8 inches wide, and assays 300 ounces silver per ton. There is one shaft 23 feet deep and 5 by 7 feet in size.

The Elm Orlon is owned by Messrs. Driscoll, Lowe, and others. They have sunk one shaft 70 feet deep and 6 by 12 feet in size, and driven one tunnel 6 by 4 feet, and 160 feet long, cutting the lode at the depth of 250 feet from the surface; also two levels, 50 feet each, and *stopes* along the levels 30 feet in height. This is a regular contact-vein, 5 feet in width, between the dolomite and quartzite. The ore is 2 feet wide. There were shipped the past season 200 tons to Utah, valued at about \$300 per ton. About 50 tons remain on the dump. The following is an analysis of the ore made at Salt Lake:

Copper.....	12. 12
Lead.....	39. 50
Zinc.....	12. 80
Arsenic.....	1. 01
Antimony.....	6. 82
Sulphur.....	10. 06
Iron.....	2. 11
Silver.....	0. 97
Silica.....	8. 41
Lime, not determined.	

93. 80

The proprietors of this mine, like all the owners in this district, are the original discoverers and locators. They are steadily prosecuting its development.

The Oneida and Niagara lodes, owned by R. P. Hopkins, J. C. Keppler, and W. T. Taylor, are prospected by shafts along the strike of the veins, from 15 to 20 feet deep. The veins vary from 1 foot to 2½ feet in width. Four inches of the ore in the Oneida assays from 40 to 500 ounces in silver per ton.

The Pride of the West is owned by Owen Gaffney. The main shaft, 6 by 7 feet in size, is 50 feet deep. The vein of ore is irregular in width, varying from 6 inches to 3 feet. Thirty tons of ore were shipped last season, at an assay-value of 150 ounces silver. There are 30 tons of ore now in the dump.

The Franklin lode, owned by Frank Gilg, Thomas A. Lowe, and Ed. R. Stevens, has a shaft 6 by 7 feet, 60 feet deep, an incline shaft 50 feet deep, and one level 30 feet long. During the past season there was sold from the dump to Dahler & Co. 107 tons, at an assay-value of 90 ounces silver. The ore-vein is 7 feet wide. There are 25 tons of first-class ore on the dump, and 175 second-class. An analysis of the ore resulted about the same as the Elm Orlon, with 40 per cent. lead.

The True Fissure, owned by Messrs. Mead, Larwill, and others, is one of the most remarkable ore-deposits in this district. It is a contact-vein between dolomite and blue limestone. The ore-vein is regular, 8 feet in width, and yields a large portion of "shipping" or first-class ore. The vein crops 1,200 feet in length north and south, and dips westerly into the mountain at an angle of about 45°. The main shaft is 120 feet deep. Two other shafts are 75 feet each. About 300 tons of ore were sold on the dump and shipped the past season, at an average value of \$175 currency per ton. There are now about 50 tons on the dump. The ore is hoisted at the shaft by hand, and then conveyed on a tram-way down the mountain 800 feet to the ore-house.

The following is the assay of one of the lots sold to Dahler & Armstrong: Moisture, 4.85 per cent.; 42 per cent. lead, 12 per cent. zinc,

and 109.35 ounces silver per ton. This had been rated as second-class ore. The first-class ore was shipped to Utah.

The Cleopatra and Ariadne, belonging to Messrs. Taylor and the True Fissure Company, and located on the same mountain, known as White Lion Mountain, the summit of which is 10,000 feet above sea-level. These claims are on the same lode, and the croppings are visible for the entire length of 300 feet. The supply of ore is abundant; reported width of vein, 8 feet. Two shafts have been sunk on this lode, each 6 by 9 feet, and 75 feet deep. The ore is mainly carbonate of lead, assaying 55 per cent. lead, and 45 ounces silver per ton. There are 300 tons of ore on the dumps. Messrs. Taylor & Pease will prosecute mining operations vigorously next season.

This is likewise the intention of the True Fissure Company, which owns also two other lodes, the Mountain Sheep and the Silver Quartz. The first of these has a shaft 50 feet in depth, and the latter two shafts, each 120 feet deep, the veins varying from 2 feet to 10 feet in width. The assay-value of the ore is about 100 ounces silver per ton, and 40 per cent. lead.

The Mark Antony, belonging to Mr. Pease, is prospected by 2 shafts 22 and 28 feet deep. The vein of ore is pretty uniform, 15 inches in width, assaying 60 ounces silver and 55 per cent. lead. There are 10 tons on the dump.

The Keokuk, belonging to G. W. Stapleton, is developed by shaft to the depth of 40 feet. It has a one-foot vein of good ore.

The Atlantis, owned by N. Armstrong & Co., situated on White Lion Mountain, just below the True Fissure and Cleopatra claims, has undergone very extensive developments during the past season. The owners have employed 18 men in mining and prospecting. The vein of ore is from 2 to 3½ feet in width, and the visible outcrop extends through the entire length of the claim, (1,500 feet.) The yield of ore has been not less than 800 tons, assaying high in lead, and from 80 to 160 ounces silver per ton.

The Hecla lode, owned by the same company, is but little developed. The ore assays high in silver and low in base metals.

The Clive and Avon, owned by the same company, are on one lode. The present developments show this to be a remarkable ore-deposit. The former claim has a shaft sunk to the depth of 185 feet, showing a vein somewhat irregular, varying from 7 feet to 22 feet in width. The silver is in the metallic state, and the ore is comparatively free from base metals, and assays from 35 to 200 ounces silver per ton. The latter claim is but little developed, but appears on the surface exactly like the former. This ore from both is of excellent quality for milling. Just below this lode, at the base of the mountain, Armstrong & Co. have located an admirable mill-site and water-privilege, where they will erect a stamp-mill during the coming season to work this ore.

The Chloride lode, owned by A. M. Morrison, and the Gopher and Crown Point lodes, owned by J. W. Earl and W. Sengler, are promising locations, furnishing rich samples of ore, and awaiting development.

About 8 miles below this camp, where the valley of Trapper Creek opens out a little in width, are located the furnace and sampling-mill of Dahler, Armstrong & Co. These works were commenced in the summer of 1874, and completed in 1875. During the past season, although the works were not finished till late, they sampled and reduced more than 300 tons of ore from the Bryant district. They will commence early in the spring of 1876 for the season's operations, which are expected to be largely profitable to this enterprising firm and at the same time beneficial

to the miners of the district. The town of Bryant is located at the mines, and Glendale at the furnace and mill. Roads and bridges are constructing in all directions.

Vipond district is about 8 miles north from Trapper. This is an old district, but has been almost inaccessible till the past year, being nestled among vast and rugged mountains, remote from the lines of public travel. About a dozen poor men have perseveringly stood by these mines for some eight years, and have finally completed a good road, at a cost in labor of not less than \$10,000. It is only 5 miles from the mines to large water-privileges on Wisdom or on Big Hole River. This district is in blue limestone. The ores are black sulphurets of silver, with a small percentage of carbonate of lead and copper-glance. There are about 50 acres of ground covered with large quantities of "float" which has been displaced from the various vein outcrops. Large quantities of ore lie on the dumps, and a still greater amount is in sight in the mines. About 30 lodes have been located, and many of them are well prospected. They are owned in 200-foot claims by different parties and companies; and on these claims many shafts have been sunk, from a few feet to nearly 200 feet in depth. The strike of the veins is generally southeast and northwest, and their width is from 3 feet to 20 feet. The general average of the ore assays from \$30 to \$75 and upward per ton. There are a few veins, however, that yield first-class ore.

The Mewanahawk,* owned by John Vipond, has been opened by a shaft to the depth of 160 feet. Mr. Vipond sold ore to Armstrong & Co. during the past season, at about \$150 per ton. His Gray Jockey lode has a shaft 50 feet deep, showing the vein to be 18 feet wide.

Dewey, Brewbake & Leggett, owning claims on the Argentine, Banner, Wassioga, and North Pacific lodes, have done a large amount of work on their several claims.

The Argentine lode has a vein of massive ore 18 feet in width, and is well developed 1,000 feet along the vein.

The Banner lode is 4 feet wide and yields first-class ore, ten tons of which, being shipped, brought \$250 per ton.

A five-stamp mill is nearly completed in this district, and will be ready for work early next season. It is confidently anticipated that the energy and perseverance of the pioneers who have prosecuted under so great difficulties the development of mining in this locality will be soon rewarded with success. To those already mentioned should be added the name of Mr. Knabe, an assayer and mining engineer, who has adhered faithfully to the fortunes of the district, opening with his own hands the promising claims of which he is the owner, and to whom I have been indebted for valuable notes.

Elk Horn district is about 25 miles northwest from Bannack, on Grasshopper or Willard Creek, the stream on which Bannack is situated. This is the latest discovered camp in the county, having been first brought to notice in 1874. Only ten claims have been located, 1,500 feet each in length. The country-rock is gray granite. The strike of the veins is northeast and southwest, running at right angles with the ridges; the dip very slight. The croppings are the largest in the county, some of them 15 feet in height, and traceable for a great distance. The veins average 8 feet in width.

The Elk Horn lode, owned by Messrs. Peck & Steel, was opened during the past season to the depth of 50 feet, by a shaft 5 by 14 feet; and

* This is the name as given by Mr. Wheeler. In my report of 1872, what I suppose to be the same vein is called by Mr. Knabe the "Miwanotack." One is as bad as the other; and it would require a Bannack Indian to decide which is correct.—R. W. R.

15 tons of high-grade ore was shipped, assaying from 500 to 800 ounces silver per ton, and 15 per cent. copper, no other base metals being present. There are 75 tons on the dump, that are expected to average 120 ounces silver per ton.

The Storm, Keystone, and Mohawk belong to Messrs. Steel & Shieberger, and have shafts sunk 10 feet deep and 5 by 10 feet in size. The Storm lode crops out boldly through the entire length of the claim, the vein being from 8 to 10 feet wide. The best ore assays 200 ounces silver; that of the Keystone and Mohawk 100 ounces silver, and from 5 to 15 per cent. copper.

The Comet, (Messrs. Mead & Smith,) Calm, (R. P. Shelton,) Comstock, (John Steiger,) and Liberty (Graeter & Co.) resemble the foregoing veins in character and in extent of development.

West Bald Mountain district.—This is still another new district, brought to notice about the same time as the Elk Horn. But few lodes have been located.

The Emerald is owned by C. Mead and O. D. Farlin, who sank a shaft the past season 50 feet deep. The vein is 4 feet wide. They shipped 12 tons to Utah, assaying 125 ounces silver. There is but little base metal in the ore, and the silver is said to be in a metallic state. About 50 tons of ore are on the dump.

The Caroline is owned by Messrs. Steel and Peck. This is a massive vein of ore, 15 feet in width, cropping out through the whole length of the claim. The ore assays from 100 to 150 ounces in silver.

The Elk Horn district is well located for wood and water. Fine pine-timber covers all the slopes of the mountains, convenient to the mining-ground.

Argenta district.—This district, with its 3,000 located claims, is almost deserted. There has been an immense amount of work done here; but the ore is generally argentiferous galena of low grade.

Birch Creek district is also deserted. It contains extensive deposits of copper and iron ores. Shafts have been sunk on some of the most prominent copper-veins from 60 to 75 and even 135 feet in depth. The Greenwich has a shaft 80 feet deep, and a vein 8 feet wide. Some of the smaller veins yield ore that assays from 50 to 70 per cent. in copper. There are also large deposits of magnetic iron-ore. Wood and water are plenty in the district.

The superior attractions of Trapper and other silver and gold districts in the county are sufficient to occupy the miners for years to come; and these older and poorer districts must await further developments and a greater population.

It cannot well be said that the silver-mining of Beaver Head County is permanently prosperous so long as ores carrying from 30 to 100 ounces silver per ton must be discarded as too poor to pay for shipment. Cheaper transportation and labor, and facilities for the reduction of ore at home, will ere long, I trust, give a really substantial basis to this industry, by permitting the profitable treatment of second and third class ores.

DEER LODGE COUNTY.

Atlantic Cable and Georgetown districts.—In my report of 1872, p. 274, will be found a description of the Atlantic Cable lode and other mines near Cable City and Georgetown. It is unnecessary, therefore, to say anything concerning the working of these mines prior to the year 1872. There is, however, much to be added to the reports of former years. Not only has the Atlantic Cable yielded, since the year mentioned,

quartz of surprising richness, but three entirely new silver-districts have been discovered in this region which promise to be as valuable as any in Montana.

The Atlantic Cable lode, which was the main stay of Cable City and Georgetown, has been in litigation for several years, and work has been entirely suspended. The Hanauer and Nowlan Mills have been closed, the former almost wholly and the latter entirely. The effect of this has been most disastrous. The two camps have but few inhabitants; the houses are empty and falling to decay; and the scene presented to the traveler is one of ruin and desolation. The direct cause of this is the fact that no wealthy companies are working any of these mines, and there are but few men employed for wages. Thus the prospector has no chance of earning by day-labor the means to prosecute explorations at intervals. Yet the district is one of the best in Montana. The Atlantic Cable is undoubtedly a rich vein, and the most recent developments tend to enhance its reputation. Work was suspended in the summer of 1873, and in the fall of the same year Mr. S. Cameron, while prospecting, struck a body of ore near the surface, about 100 feet south from "discovery" of this lode. From this pocket Mr. C. took out 100 tons of quartz, which yielded, it is said, in the Hanauer Mill, \$20,000. From the same body of ore, about two tons treated by hand (mortar-crushing) yielded \$8,000. Besides this, Mr. Cameron has a collection of specimens weighing altogether about 200 pounds, and presenting large masses of gold. One piece, almost solid gold, is worth \$375. Another about the size of a small hen's egg has projecting from the quartz a mass of pure gold in the shape of a finger, containing the precious metal to the value of \$75. There are in the collection numerous pieces of solid gold weighing as much as an ounce each. It is intended to exhibit the suite at the Centennial Exhibition, in Philadelphia. The Atlantic Cable lode will be made the initial point in describing the position of other ledges in this district. It runs northwest and southeast on Cable Hill, lying 15 miles south of Philipsburgh.

Below the Atlantic Cable are the placer-mines, late Kohrs, Bell & Co's. These are now owned equally in undivided interests by Mr. Conrad Kohrs, of Deer Lodge, and Mr. S. Cameron, of Cable, a half interest having recently been purchased by Mr. Cameron. These are "hillside diggings," containing a large amount of "float" quartz, of the same nature as the Cable rock. Work was commenced in 1871 and suspended in 1874, in order to use the water in working placer-mines in Georgetown. The Georgetown mines having been worked out, work has been resumed this summer by Messrs. Kohrs & Cameron, who have constructed very expensive and extensive hydraulic works. Since the opening of these mines about \$80,000 have been taken out. It is estimated that the deposit can be continuously worked for five years more. The work is under the personal superintendence of Mr. S. Cameron, assisted by Mr. E. D. Aiken, a miner of experience, as foreman. The little settlement of the hands employed in these mines presents a marked and pleasing contrast to the ruins of Cable City and Georgetown.

The North Pacific lode was located in 1869, and is supposed to be an extension of the Atlantic Cable. This ledge resembles the Cable in all particulars. There are the same white limestone fragments found in the vein-matter, and the environment of the richest by spar is a feature of both lodes. The North Pacific is owned by William Nowlan, S. Cameron, and others. No considerable quantity of paying rock has yet been taken out. Mr. Cameron's theory is that they are below the rich

ore, and that they will have to drift up the hill. The shaft on this lead is 125 feet in depth.

The Pyrenees is a gold-bearing vein in the Georgetown district, and is situated a mile and one-half south of the Atlantic Cable mine. It was discovered in May, 1875, by John Murphy, S. Cameron, and Robert S. Kelly, and is now owned by Messrs. Cameron & Kelly. The ledge runs southeast and northwest, up and down the hill. The owners have drifted on it longitudinally about 100 feet, and are now sinking from the end of the drift. The vein lies between two granite walls, with a 6-inch seam of white clay between the quartz and wall-rock, the latter being perfectly defined, and the vein varying in width from 18 inches to 3½ feet. The rock is a dark-brown quartz, showing particles of free gold. There are between forty and fifty tons on the dump, that will yield from \$45 to \$50 per ton.

The Whin-Doodle is a gold-bearing vein, discovered in 1872, and owned by Charles Jeffries and J. S. Smith. It runs southeast and northwest and lies one-quarter mile southwest of the Pyrenees. This ledge has a 26-foot shaft, showing a 3-foot crevice, and yields a quartz of the same character as the Pyrenees. There are fifteen tons of ore on the dump, that will mill from \$40 to \$50 per ton.

The Pittsburgh is a gold-bearing vein, running southeast and northwest, and lying 3,000 feet northeast of the Pyrenees. It was discovered in 1871 and is owned by Lewis Reese & Co., of Pittsburgh, Pa., who hold an undivided half interest, and Messrs. Shively and others, who together hold the other half. This ledge has a 100-foot shaft, showing a 2-foot crevice, and yields quartz of the same character as the Pyrenees. There are six or eight tons on the dump, that will mill from \$40 to \$50 per ton.

The North Atlantic is a gold-bearing vein, situated one mile northwest from the Atlantic Cable. It was discovered in 1867 by George Cater and John McKay, and is now owned by them. The quartz is similar to that of the Atlantic Cable, and will mill about \$20 to the ton. There is a 50-foot incline on the vein.

The Four Johns is a ledge on the same hill as the Pyrenees. It is opened by two shafts, 165 and 180 feet deep, respectively. John Murphy is the owner. There is a large quantity of decomposed quartz on the dump, which Mr. Murphy proposes to run through sluice-boxes next spring.

The Rosa Whitford is a gold-bearing vein lying about two miles south of the Atlantic Cable, and running northerly and southerly. It is from 8 to 9 feet in width, with well-defined wall-rocks. The rock is a dark-brown decomposed quartz carrying fine gold. The owners of the ledge are Dr. Whitford, William Foster, and Thomas Stewart. They have put down an incline, at an angle of 45°, to the length of 65 feet. Messrs. Whitford & Co. are engaged in the erection of a 5-stamp mill to work the ore from this mine. There is about eighty tons of ore on the dump, specimens of which assay variably all the way from \$10 to \$176 per ton.

There are many other claims, but no trustworthy information can at present be had concerning them.

Mr. Charles Jeffries owns placer-mines at Georgetown that will pay from \$6 to \$10 per day to the hand. The great trouble with working the Georgetown diggings, which are undoubtedly rich, is the level nature of the ground and the consequent want of dumping-room.

Of the two gold-mills at Cable, the Nowlan mill was recently sold for taxes, and was bought by D. S. Corbin, assignee of William Nowlan. It has been entirely idle for several years.

The Hanauer mill, now owned by L. H. Hershfield & Bros., of Helena, is in good running order, and will soon start, crushing Pyrenees rock, under the direction of Mr. S. Cameron.

Silver Lake district, one of the newly discovered silver districts, is beautifully situated on the well-timbered hills, surrounding a very romantic lake of clear water, about one square mile in extent, and of very great depth. The lake has no visible outlet. The district was located in November, 1874, and is about five miles south of the Atlantic Cable lode. The country rock is white limestone. The veins discovered last fall show very rich chloride and sulphuret ores, assaying as high as \$3,000 to \$10,000 per ton. The two best veins appear to be the Silver Moss, so named from the appearance of the free silver in the ore, and the Romeo. There are shafts sunk from 40 to 50 feet. A considerable quantity of quartz has been taken out that will assay from \$400 to \$500 per ton; and a few tons are ready sacked for shipment, that will assay \$1,500 per ton.

Silver Hill district was discovered in June, 1875, and is situated from four to five miles west of Silver Lake district, in a heavily timbered and exceedingly rough country. There are several narrow veins containing quartz similar to that of the Silver Lake district.

The *Deer Lodge district* was discovered in June, 1875. It is situated about six miles northeast from the Atlantic Cable lode. The principal veins recorded are the Crystal, F F, Beecher, and Moonbeam. There are numerous prospecting shafts sunk from 5 feet to 35 feet. The specimens taken out by Mr. Cameron, one of the original discoverers, resemble the quartz from Silver Lake district.

The ore from these districts is said to be free-milling ore, but that will probably pay better if treated by the roasting process. In many respects it resembles that found on the Comanche Hill, in the Philipsburgh district.

There is no doubt that this section of country is exceedingly rich in both silver and gold. It is gaining the attention of miners and quartz speculators, and will soon rise to prominence as one of the richest sections in Montana.

All that it is necessary to add here is that this neighborhood has not been even fairly prospected; that the water and timber advantages can hardly be surpassed; that the grazing is excellent, and the facilities of communication with Deer Lodge City are good. Wages for miners at quartz and placer mines are \$4 per day. Board costs \$8 per week.

Philipsburgh district.—The town or village of Philipsburgh is situated near the mouth of Camp Creek (a tributary on the right bank of Flint Creek), in latitude $46^{\circ} 21'$ north and longitude $113^{\circ} 16'$ west from Greenwich. The district (also called, I believe, Flint Creek district) is traversed by three gulches, running from east to west, nearly parallel, and about three-eighths of a mile apart. Of these Camp Creek is the central one, Frost Creek lying to the south and Comanche Gulch to the north of it. These creeks all head in a spur of the Gold Creek Mountains. The mines are located within an area about two miles in length, easterly and westerly, from the base of the foot-hills up the gulches, and two miles in width northerly and southerly across said gulches. The country-rock is limestone and granite, the dividing-line between the limestone and granite running north and south on the eastern edge of the present mining-camp. Some of the mines on Trout Hill lie on this line, having the north wall of limestone and the south of granite.

Camp Creek appears to be the dividing-line between two distinct kinds of vein-material, nearly all north of this line being free-milling

ore, while nearly all south of it is roasting-ore. However, nearly all the ores, both north and south of this line, may be advantageously roasted before amalgamation.

The whole of this district is covered with "croppings" and "float," the claims recorded and represented being almost countless. A large amount of work has been done in prospecting. In this report only the most prominent and promising lodes are mentioned. Of those lying south of Camp Creek, and containing ores that can be worked to advantage by the roasting-process only, may be mentioned the following, running easterly and westerly: The Speckled Trout, Gem, Cliff, Poca-hontas, Portland, Kitty Clyde, Navajo, Scratch-awl, Franklin, Burr, Algonquin, Overman, Estell, Little Jenny, Caledonia, and San Francisco. Running northerly and southerly: The Golconda, Cordova, Sharktown, Salmon, and Black Tiger.

The Speckled Trout has been mentioned in my former reports. It has a great reputation for width and richness of vein, but the present management (the Northwest Mining Company, to which the mine and mill were sold a couple of years ago by Mr. Cole Saunders, for the reported sum of \$250,000) pursues a policy of strict secrecy, allowing no visitors to examine the works, and furnishing no information to inquirers. Opinions are divided as to the condition of affairs indicated by this policy, the majority inclining, perhaps, to infer that the mine is very much richer than the owners care to permit the public to know. The circumstances will, of course, bear another construction. According to information which I receive from a tolerably trustworthy source, the present length of the incline is 237 feet, at an angle of 45° , and the aggregate length of tunnels and levels is about 500 feet. A vertical shaft is now in progress, to strike the incline 150 feet from the surface. The ore is said to be in a continuous vein of great width and high grade.

The Salmon, owned by Messrs. Estell and Holland, of Philipsburgh, is situated on Trout Hill. This is a contact-vein, 8 feet wide, lying between limestone and granite. The claim, located in 1866, comprises 1,200 feet of patented and 400 feet of unpatented ground. The cost of work done in developing it was \$3,000, including two shafts, 46 feet at an angle of 45° and 30 feet vertical, respectively. The gangue is quartz; the ore galena, carbonate of lead, with silver sulphurets, &c. The highest assay made from picked rock ran up to \$3,500. The amount of ore taken out of this mine and all now on the dump is 125 tons, of an average value of \$125 per ton.

The Franklin, owned by various parties, is situated on Franklin Hill on the south side of Frost Creek. It was located in 1866, 400 feet being claimed. About \$3,000 worth of work has been done in developing. The shaft is 40 feet, vertical, with a tunnel 50 feet in length. The country-rock is limestone; the gangue, quartz; the ore contains galena, carbonate of lead, manganese, antimony, and sulphuret of silver. The highest assay ever made from picked rock ran \$5,000 per ton. About 60 tons of ore have been taken from this mine, with an average value of \$130 per ton. There now remain on the dump 20 tons, that will average \$100 per ton.

The Gem, owned by the Irvine family, of Deer Lodge City, is situated on Trout Hill. The claim, located in 1867, is 2,200 feet in length, and has had \$1,500 worth of work done on it. The shaft is 100 feet, vertical. The country-rock is limestone; the gangue, quartz; the ore contains galena, carbonate of lead, sulphuret of silver, and magnanese. The highest assay made went \$600 per ton. There has been 50 tons of

ore taken out, of an average assay-value of \$125 per ton, which is now on the dump.

The Cliff, owned by the Hope Mining Company, of Saint Louis, Mo., is situated on Trout Hill. It was located in 1866, with a claim of 1,150 feet. The vein outcrops for nearly 2,000 feet, from 8 inches to 2 feet in thickness, running east and west, with dip about 87° south. Value of work done in developing, \$2,500. Length of shaft, 28 feet, with 80 feet of tunnels and levels. The country-rock is white magnesian limestone and quartzites. The gangue is quartz; the ore, zincblende and argentiferous galena. The highest assay of picked rock yielded \$259.67 per ton. Average assays of the three grades of ore: First quality, \$60; second quality, \$25; third quality, \$17.50. About 25 tons of rock has been taken out, and is now on the dump, of an average value of \$20 per ton.

Among the claims deserving at least brief mention are the following:

The Caledonia, owned by W. Graham, of Philipsburgh; \$100 expended in development, and 1½ tons of ore extracted, of the average value of \$75 per ton.

The Overman, owned by W. Graham, of Philipsburgh; \$200 expended in development, and 1½ tons of ore extracted, of the average value of \$40 per ton.

The San Francisco, owned by Estell & Holland, of Philipsburgh. This ledge is in the granite, has a shaft 41 feet deep. Development cost \$250, and 50 tons of ore taken out have an average value of \$40 per ton.

The Estell, owned by Estell & Holland, of Philipsburgh, is in limestone and granite; shaft, 26 feet; cost of development, \$200; and 25 tons of ore, of the average value per ton of \$50, taken out.

The Navajo, owned by C. V. Timmons & Co., is situated on Trout Hill, in limestone; has shaft 40 feet deep; \$300 expended in development, and 5 tons of ore, averaging \$100 per ton, taken out.

The Scratch-awl, owned by Murray, Durfee & Co., of Philipsburgh; is in limestone, with a shaft 60 feet deep, and a cut 12 feet long; \$700 expended in development, and 5 tons taken out, that will average \$100 per ton.

The Cordova (numerous owners) has a 30-foot shaft, and 120 feet of tunneling; 500 tons of ore have been taken from this mine, that will average \$50 per ton; there has been \$3,000 expended in development.

Of ledges lying north of Camp Creek, and containing ore capable of being worked by free-milling processes, but that can be yet better worked by the roasting process, may be mentioned the following:

The Comanche, Comanche Extension, Hope, Emma, Dead Thing, U. S., Cordova, Whistle-pecker, Mohawk, Willard, Ophir, Mountain Queen, Acquilla, Dashaway, Apache, and Silver Bend.

The Comanche, owned by the Hope Mining Company, of Saint Louis, Mo., is a 4-foot vein, striking east and west, with quartz gangue, and ore carrying sulphurets of silver and copper. The company claims 550 feet, under a location made July 11, 1866. The development consists entirely of open work, and has cost \$6,000. The highest assay made from picked rock yielded \$1,560.41 per ton. Three grades of ore will average as follows: First quality, \$200; second quality, \$60; third quality, \$25; with a general average of \$50 per ton. The rock inclosing the vein is a dark-blue limestone. The quantity of ore taken out since opening cannot now be estimated. There is now on the dump 16 tons, that will average \$200 per ton.

The Comanche claim No. 2, owned by Dr. J. M. Merrell, of Philips-

burgh, was located in 1866. It covers 200 feet. The country-rock is limestone. Quartz and spar form the gangue, with ore of sulphurets of silver and copper. The shaft is 115 feet deep, on an angle of 45° ; \$4,000 has been expended in development. The highest assay from picked rock yielded \$1,000 per ton. There has been 400 tons taken out, with an average value of \$45 per ton; and the dump now contains 150 tons, with an average value of \$37 per ton. The vein runs east and west.

The Comanche Extension is held by numerous owners. The vein is traced 2,200 feet, and was located in 1866. There has been fully \$10,000 expended in development, and several shafts have been sunk, varying from 20 to 80 feet in depth. There have also been several levels and tunnels run, aggregating 500 feet. The lode is inclosed in limestone, with quartz and spar for gangue, and ore consisting of carbonate of lead, sulphurets of silver, copper, &c., varying considerably throughout the vein. The highest assay made from specimen rock was \$2,000 per ton. The average ore is of low grade. There has been about 1,000 tons of ore taken out, that will average about \$25 per ton; this is nearly all now on the dump. The vein strikes east and west.

The Hope, owned by the Hope Mining Company, of Saint Louis, Mo., is a vein of free-milling ore, consisting of sulphurets of silver and copper, with ruby silver; quartz gangue, inclosed in white and blue limestone. The vein has an easterly and westerly direction, and varies in thickness from 1 to 20 feet. The company claims 650 feet. The mine was located July 10, 1867. There has been \$40,000 spent in development. There are two shafts, respectively 150 feet and 70 feet in depth; an incline of 115 feet, at an angle of 38° , and 550 feet of tunnels and levels. The highest assay that has been made from picked rock yielded \$3,851.25 per ton. The three grades of ore yield by assay the following averages: First quality, \$200; second quality, \$60; third quality, \$25 per ton. The amount of ore taken out will reach 2,500 tons, with an average value of \$90 per ton. There is now on the dump 500 tons, with an average value of \$97 per ton. The working-results of this ore in the company's mill at Philipsburgh show an average yield of \$58.14 per ton, although the richest ore has not yet been worked.

The Emma, owned by Estell & Holland, is situated about 400 feet north of the Comanche, with a claim of 1,500 feet; was located in 1872. The gangue is quartz and spar, and the ore contains sulphurets of silver and copper. The highest assay made from picked rock gave \$5,000. There have been 120 tons taken out, of the average value of \$90 per ton, 108 tons of which are now on the dump.

Deserving a somewhat shorter notice are the following:

The Dead Thing, owned by W. Graham, has \$250 expended in development, and 5 tons, of the average value of \$45 per ton, taken out.

The Willard, owned by Estell & Holland, has shaft 20 feet deep; \$200 expended in development, and 20 tons, worth \$100 per ton, taken out.

The Cordova, owned by various companies, has a 30-foot shaft, and 120 feet of tunneling; \$3,000 spent in development, and 500 tons, of an average value of \$50, taken out.

The Dashaway, owned by the Hope Company, has had \$500 expended in development.

The Apache, owned by Murray & Durfee, has a shaft 190 feet deep, and 250 feet of tunnels and levels; \$10,000 expended in development, with but small product of ore, according to report, and that of low grade.

This comprises a list of the most prominent lodes in the district, although it gives no adequate conception of the amount of work that

has been done in prospecting. Doubtless many important discoveries will still be made in this locality, and the oldest and most experienced residents are exceedingly sanguine.

Messrs. Murray & Durfee have commenced running a tunnel, called the Sharktown tunnel, through the Trout Hill. It starts from about the center of the north side of Trout Hill and runs south. If carried on, it will cut the Speckled Trout and other mines containing the richest ore yet found in the district. The mouth is 900 feet below the level of the summit, far lower than any of the shafts on the hill have been sunk. The tunnel has advanced 60 feet, and has struck an ore-vein consisting of feldspar, manganese, and quartz of poor quality. The tunnel is 6 feet wide by 6 feet 6 inches in height in the clear. The work is pushed forward rapidly, and it is proposed to proceed right through the hill. What result, further than draining the hill, will be obtained by this labor it is impossible to say. The proprietors are old and energetic miners, who feel very sanguine of striking new veins of ore.

The three largest companies working here are the Northwest Company, the Hope Mining Company, and the Belmont Company. Of the results of working in the Cole Sanders Mill, recently purchased by the Northwest Company, the following is worthy of note: That in a three months' run with a 5-stamp battery, and a drop of 46 inches, at the rate of from 110 to 120 per minute, there was a yield of \$45,000 from the ore crushed. This ore came from the Speckled Trout Mine. The chloridizing roasting resulted in 85 per cent. saved. This roasting process was first adopted in working the Speckled Trout ore, by the advice of Prof. Charles Speight, and proved a perfect success. Mr. Speight succeeded in chloridizing up to 96 per cent. on one occasion; and during his superintendence of the mill the average was from 90 to 92 per cent.

The Hope Mining Company has in town a fine stone mill of 10-stamps now under repair. New machinery is on the road for this mill, which will start up again before long.

The Belmont Company, of Saint Louis, Mo., is now at work on the Comanche extension. A mill-site has been surveyed, a millwright engaged, and active preparations are making for the immediate erection of a 10-stamp mill for wet-crushing. The company will probably expend \$75,000 in these improvements.

The Northwest Company is adding 5 stamps and otherwise improving and enlarging its mill.

Altogether, the camp promises exceedingly well and bids fair to be the most prosperous in Montana.

Of the country surrounding the district, it may be said that the supply of timber, both for building purposes and for fuel, is very abundant, the water-supply is excellent and of large extent, while the foothills and valley are "a paradise for stock."

Butte district.—Activity in this district, both in building and in mining, has advanced daily since the 1st of September, when the population began notably to increase. Notwithstanding the severity of the weather in November, the work of building dwelling-houses, shaft-houses, and mining operations was prosecuted with much energy. Since the 1st of October forty-eight dwelling-houses and six business-houses have been erected at Butte; the new town Travona, three-fourths of a mile distant, has sprung into existence, with 25 or 30 completed buildings, and, in addition to this, 18 shaft and ore houses have been built at the mines. These are mostly of logs, though many are framed, a few being large and fine enough to befit the most pretentious

city in the Territory. Two mills, Farlin's and How's, are fast approaching completion. Work has been retarded by the severe weather in November, and by the impossibility of getting lumber as fast as needed. The mills are designed to be of similar capacity, 10 stamps, though the Farlin mill is much superior in size, being 54 by 108 feet, besides a furnace-building, covering a still larger area. The machinery and equipments are all new and first-class. The How mill was removed from Brown's Gulch, 85 miles distant, and is considered as good as new. The main building, now inclosed, is 38 by 70 feet, with a southern projection 24 by 36 feet.

The latest developments in mining have been made principally on the following-named lodes, each of which have shafts sunk 30 to 60 feet and work progressing, with shaft-houses erected or in course of erection:

Late Acquisition lode; Leffler & Clark; ore, rich silver sulphide.

Mount Moriah lode; W. A. Clark; character of ore not determined.

New Era lode; Irvine & Noyes; lead carbonates and sulphides, assaying high in silver.

Late Acquisition Spur lode; Packer and others; two feet of rich quartz, bearing sulphide of silver; assays \$200 to \$600.

Banker lode; Smith & Coughenour; twenty inches of homogeneous quartz, bearing sulphide of silver; with traces of lead and iron; assays, unassorted, from \$200 to \$300.

La Plata lode; Downs, Leary, Jones, and others; 3½ feet of rich silver and gold bearing ore; silver mostly as sulphide; fine prospect for large quantities of free-milling ore.

Buenos Ayres lode; Farraday & Clark; believed to be the western extension of the La Plata; ore similar.

Josephine lode; Butcher, Archibald & Ramsdell; 2½ feet of galena and lead carbonate, assaying high in silver; fine smelting-ore.

Frank Moulton lode; W. A. Clark; 2 to 3 feet of silver-bearing quartz, with some carbonate of lead.

Wappello lode; W. L. Farlin; character of ore not tested.

Anselmo lode; F. Hirsch and others; 2 feet of fine ore, carrying silver sulphide; assays up to \$400 per ton.

Neptune lode; Prowse, Clark, and others; a strong vein of ore, carrying sulphide of silver; assays \$100 and upward.

Stinson (?) lode; Stinson; 2½ feet of quartz, carrying considerable silver; same character as Neptune, of which it is probably an extension.

Mountain Boy lode; Sherr, Bosman, Jockey, and others; 3 feet of quartz, with seams of very rich chloride of silver; assays \$200 to \$800.

Anglo-Saxon lode; W. L. Farlin; a strong vein bearing silver and gold; contract to sink 50 feet nearly completed.

In copper, the development at present is mainly on the Parrot lode. One claim, owned by Parks & Ramsdell, has a shaft over 100 feet, with levels, from which a rich oxide of copper is taken and shipped east for reduction. Another shaft, owned by Downs & Leary, is now leased to Captain Parkinson, who is taking out fine ore from the 100-foot level.

These lodes are undergoing active development; scores of others have had "representation work" done. The rich veins, Travona and others, owned by W. L. Farlin, though better developed than any other silver-mines in the camp, are not raising ore at present, but will resume when the mill starts up and better facilities for removing the water have been applied.

The present status of the camp is very encouraging. Great expectations are indulged for next season, smelters and reduction-works for copper-ores and base silver-ores will probably be built next summer.

These, with the mills now erecting and others projected, will, it is anticipated, make Butte the leading camp of Montana.

In addition to the copper-mines at Butte, in Deer Lodge County, very rich copper-veins have been discovered by Messrs. Arnold & Door, Mr. Chisholm, and others, at the head of Snow-Shoe Gulch, near Blackfoot City. The ore is a beautiful green carbonate, and that selected and sold for shipping averages 50 per cent. copper.

LEWIS AND CLARKE COUNTY.

The mines in this county have been so fully described heretofore that, with the exception of the *Ten-Mile district*, given below, I have not thought it necessary to treat them over again. Some new discoveries of silver and copper veins have been made since my last report.

The most noted silver-vein is called the Lexington, and is situated about four miles northeast from Helena. The vein is about 4 feet wide, and the ordinary vein-matter will average about \$150 per ton in assaying. But lately the owners have struck a zone about 12 inches wide that is marvellous in richness. It appears to be composed of horn-silver and native silver in mossy bunches, and net-works of wires crossing each other as large as straws. The specimens are extremely beautiful, and of course yield by assay very high values, (up to \$25,000 per ton.) This valuable claim is owned by Mr. W. C. Child, of Helena, and Mr. Benjamin, of San Francisco. Work is being pushed forward on it now, and the mine will be thoroughly tested during the coming year.

A large number of argentiferous galena-lodes in the vicinity of Helena, and some almost within the town limits, have been discovered and proved to be valuable.

Fine copper-veins have been discovered during the past year across the Prickly Pear Basin, within 15 miles of Helena. Some of the veins are from 7 to 10 feet in width, and the ore runs from 20 to 40 per cent. copper. Generally only enough work has been done on them to comply with the laws of Congress and the Territory to enable the discoverers to hold them.

The gold-veins and the working of the quartz-mills at Unionville and Park City, 4 miles west of Helena, have been fully described in my former reports. No new discoveries of importance were made in these localities during the past year; but the mines have yielded about the usual average, and have given steady employment to several hundred men, with profits believed to be satisfactory to their owners.

Ten-Mile district.—This district comprises a somewhat indefinite range of country on Ten-Mile Creek. The principal mines are about 20 miles in a southwesterly direction from Helena. Red Mountain, situated near the center of the district, rears its crest nearly 11,000 feet above the level of the sea and 2,500 feet above the level of the creek.

The geological formation of the district embraces nearly all of the varieties of granite—syenite, perhaps, predominating—traversed by occasional porphyritic dikes. On the north and east is a limestone formation, and about 10 miles northwesterly from Red Mountain the Carboniferous system makes its appearance, in which a bed of coal has been discovered.*

* In the absence of a personal examination or a geological survey of recognized authority, I cannot vouch for the accuracy of the geological descriptions furnished by my correspondents, who frequently adopt, without the opportunity of careful verification, the theories and the nomenclature current among the miners. Red Mountain, for instance, has once been reported to me as sedimentary rock, once as porphyry, and once as an extinct volcano. That the "Carboniferous system" here alluded to is true Carboniferous is not likely, because it contains coal, whereas the Carboniferous strata of the Rocky Mountains are deep-water formations and barren of coal.—R. W. R.

The development of the mineral wealth of the district has been very much retarded by a lack of adequate facilities of transportation, a disadvantage indeed which besets the mining-industry of the whole Territory. No ore of less value than \$200 per ton can at present be utilized by the miner; and although considerable quantities have been shipped from the district, much of which has yielded as high as \$400 per ton, still it is evident that ore of so high a grade can constitute but a very small proportion of the material mined in any district, for the poorer ore is present in predominating quantity, and much of it must be extracted in order that the richest may be sorted out.

The subject of concentration has of late engaged the serious attention of our miners. There is a great deal of ore in this district which will yield from \$20 to \$80 per ton in silver, but which is at present valueless unless it can in some comparatively inexpensive way be separated from the accompanying gangue.

Mr. J. W. Gonn has recently made some experiments in this district with a view to utilizing, at small expense, his low-grade ore, and has apparently met with an encouraging degree of success, by means of a somewhat rude process, as follows: The ore as it comes from the mine is first crushed in a Chilian mill and run into a large tank. It is then taken out and washed in a large fluming-trough, 12 feet long by 26 inches wide. The heavy ore remains in the box, while the gangue and the proportion of ore that will necessarily go over is run through common sluice-boxes over riffles and blankets. The blankets are washed every fifteen minutes, and what is thus saved is again washed in the head-box. In this way ten to fifteen tons are concentrated into one, which assays \$1,560 per ton.

The following is a synopsis of such lodes only as have been to some extent developed:

Hope Ever, situated in the southern part of the district, on Benner Creek, and one of the first discoveries. Its strike is south, 58° east; dip, south. It is a large vein, carrying some lead, copper, and zinc, and gold and silver in small quantities. On the surface some very fair prospects of gold were obtained, on the strength of which machinery was purchased and a mill erected, which was run but a short time, and has since stood a mute monument to the folly of building mills before developing lodes.

North Pacific, discovered May 10, 1873. Course of vein nearly east and west; dip, about 60° south. The crevice varies in width from 4 to 11 feet. The general character of the ore is sulphureted, galena predominating, accompanied by zinc-blende, copper-pyrites and fahlerz. The blue and green carbonates of copper are met with, however, in the higher portions of the vein. This has been the most extensively-worked claim in the district. Two adits have been driven on the vein, the lower one 290 and the upper one 154 feet. A shaft has also been sunk 110 feet. One hundred and thirty tons of ore, taken mostly from the shaft and upper tunnel, have been shipped from this mine, which yielded about \$300 per ton. One thousand tons of ore are now on the dump, which will require to be concentrated before it will be valuable at the present rates of freight.

South Pacific; a continuation of the North Pacific, and a very similar vein, but not sufficiently developed to determine its value.

Silver-Glance. This is a 1,500-foot claim, and is situated on Red Mountain proper, about 400 feet south of the North Pacific. Discovered June 25, 1873. Course of vein, east and west; dip, south. Crevice, 7 feet in width, but ore-streak narrow, varying from 6 to 15 inches. An adit

has been driven along the lode 300 feet, and a shaft was sunk at the head of the tunnel to the depth of 45 feet. About 100 tons of ore from this lead were worked by the barrel process, but owing to the base metal in the ore, and perhaps somewhat to the inexperience of the amalgamator, the result was in most respects unsatisfactory. Subsequently the owners shipped 10 tons of ore to Swansea, which sampled nearly \$400 per ton. The claim has been surveyed and a patent applied for.

Try Again; discovered July 12, 1873. Strike, north 58° east; dip, south. A shaft has been sunk on this lode to the depth of 103 feet, showing an ore-streak $2\frac{1}{2}$ feet wide, which assays from \$90 to \$350 per ton. The gangue is quartz, carrying fahlerz and brittle silver. Some galena was taken from the top of the mine and shipped, which averaged a little less than \$200 per ton. The owners are now concentrating ore from the lowest workings with a view to shipment.

Little Nellie; discovered October 31, 1873. Situated on the west slope of Red Mountain, about 700 feet west of the Silver-Glance. Strike, east and west; dip, south. Crevice 3 feet wide, and filled with ore, comprising lead and iron as sulphides with copper as carbonate, and fahlerz. The ore is of rather low grade and will need to be concentrated.

Caledonia, situated about 1,000 feet west of the North Pacific claim. Strike, east and west; dip, south. This is a large crevice carrying a large body of talc and quartz, with about 6 inches in width of galena which assays on an average about \$100. A tunnel has been run on the vein about 45 feet.

Merritt, situated near Ruby Creek. Strike, east and west; dip, south. A tunnel has been run on the vein 75 feet. Width of crevice, 11 feet; width of ore, 4 feet. Gangue, quartz and hornblende, the hornblende being speckled with fahlerz, which I believe is a very rare occurrence. The ore of this mine will require concentrating.

Mammoth, situated 1,000 miles north of the North Pacific. Discovered May 13, 1873. Shaft sunk 45 feet, showing a 12-foot crevice containing talc, quartz, and galena. Some of the galena shipped to eastern reduction-works sampled \$111 per ton.

Carbonate, situated east of the Try Again. Discovered August 29, 1874. This vein is 2 feet wide and contains iron-pyrites, carbonate of lead, and galena, the average assay-value of which is \$120 per ton. A shaft has been run on the lead 45 feet.

O. H. Bassett, one of the best-looking claims in the district for the amount of labor done. It has been traced for several hundred feet by a succession of shafts, in all of which is exposed a very handsome and well-defined crevice, from 4 to 5 feet wide, containing 2 feet in width of milling-ore, which assays about \$100.

S. P. Bassett, situated 200 feet north of the North Pacific, and a well-defined lode, but contains, so far as yet developed, only a small quantity of ore. A tunnel has been driven about 40 feet.

Daniel Stanton, situated 400 feet south of the Caledonia claim. This mine at one time presented the largest body of galena ore that has been developed in the district. The chimney extends about 100 feet along the lode and is from 3 to 5 feet wide. Its extent in depth is not known. Two tunnels have been run on the vein aggregating 200 feet, and a shaft has been sunk 50 feet. Several hundred tons of galena have been taken out, the assay-value of which was about \$150 in silver and 70 per cent. lead. Two shipments of ore have been made to Philadelphia, Pa.

Micawber, two hundred feet south of the Silver-Glance. Strike, east and west; dip, south. One of the largest and strongest veins in the district. A shaft sunk at discovery to the depth of 40 feet, and levels

driven from the shaft. A large part of the ore is milling-ore, (quartz carrying gold and silver,) while a considerable portion is galena carrying iron and copper pyrites. About 20 tons of this ore, the assay-value of which was \$300 per ton, has been shipped to Philadelphia.

Hamlet lode, situated on the west slope of Red Mountain proper. Course, east and west; dip, south. Width of crevice, 4 feet, carrying galena, zinc-blende, and gray antimony, assaying from \$40 to \$100 per ton. About \$1,000 worth of work has been done on the claim.

McDonald; strike, east and west; dip, south. Width of vein, 5 feet. Gangue, quartz, carrying sulphides of lead, zinc, antimony, and silver, of which latter there is about \$40 per ton.

Bunker Hill, situated 200 feet north of the South Pacific. Strike, east and west; dip, south. A large well-defined vein, the gangue of which is quartz, carrying lead, zinc, and antimony in the form of sulphides, and assaying \$35 per ton in silver. Some specimens of molybdate of lead have been found in this mine. A tunnel has been run on the lode about 30 feet.

Teal Lake, discovered June, 1873. Course, east and west; dip, south; width of crevice, 4 feet. Gangue, quartz and albite, carrying galena, zinc-blende, and carbonate of copper, and assaying as high as \$200 in silver per ton; picked specimens assay as high as \$1,000 per ton. There has been about \$2,000 worth of work done on the claim.

Green Grove; strike, east and west; dip, south; width of crevice, 6 feet; matrix, quartz and talc, carrying galena and carbonate of copper. Some specimens of brittle silver-ore have been found in this mine. A tunnel has been run on the lode about 30 feet.

Free Speech; strike, east and west; dip, south. Ore, argentiferous galena and copper-pyrites, with a sprinkling of brittle silver. Average assay, \$100 per ton.

Home Ticket; strike and dip like the preceding. A large vein of talc, containing galena and zinc-blende, but little developed.

Lee Mountain. This claim is 2,200 feet in length, and is one of the oldest locations in the district, having been discovered in 1865. It is a very large vein, and has been traced several hundred feet on the surface. The gangue is talc, in which are imbedded galena, zinc-blende, copper carbonate, copper-pyrites, and iron-pyrites. There are occasional pockets of galena nearly or quite filling the crevice. The average assay in silver is about \$80; picked specimens assaying very high. Situated opposite mouth of Beaver Creek.

Sixty-Ninth, discovered in 1875. Situated on the north side of Beaver Creek. A 2,200-foot claim. Crevice, 10 feet wide. The ore in this vein is 6 feet in thickness, mostly milling-ore, assaying from \$25 to \$80 per ton. Two shafts have been sunk, one to a depth of 25 feet and the other 15 feet.

Robert Lee, a west extension of the Lee Mountain.

Barnum W. Field, supposed to be an east extension of the Lee Mountain.

Evening Shade, situated on the east side of Beaver Creek. Discovered 15th of July, 1873. Crevice, 4 feet wide, carrying galena, which assays \$40 per ton in silver, picked specimens assaying as high as \$400 per ton. A cross-adit has been driven 184 feet at right-angles to the lode, which it cuts at the depth of 120 feet. Thence a drift was run on the crevice 40 feet. The ore will require to be concentrated.

The foregoing comprise but a small part of the claims located in this district, but it is believed to embrace all those that have been developed

to an extent sufficient to permit intelligent judgment as to their permanency.

JEFFERSON COUNTY.

The very numerous silver-lodes in this county were mostly described by name in my reports for 1873 and 1874.

The groups in the vicinity of Jefferson City and in the Boulder Valley have been extensively worked during the year, partly with a view to their development and partly for profit.

Work on the Legal Tender, near Clancy, has been suspended on account of water. New machinery and larger pumps will have to be procured before work can be resumed.

The mine is claimed to be as rich as ever, and able to yield \$100,000 per year, as formerly, when the necessary improvements are made. Its neighbor, the Mammoth, is idle because of the lack of mills to reduce its rich ores, and for the want of freighting facilities, as are many others in the vicinity of Clancy.

Five hundred tons of galena-ore have been taken out of the famous Gregory lode, near Jefferson City, and sacked ready for shipment during the past winter. As much more could very soon be prepared, but will wait, for want of transportation, until another year.

The Argentum lode, near Jefferson City, has not been worked during the year, because the owners prefer to wait for the erection of reduction-works at home. In 1873 over 100 tons from this mine were shipped to Omaha. The gross value after reduction was \$237 per ton, yet the shippers only received about \$100 per ton on the lot for their share, after paying all expenses of mining, sacking, reduction, commissions, &c.

Boulder district.—The Rumley, Comet, and adjoining claims in the district have been pretty extensively developed the past autumn and winter. The Rumley will ship during the summer of 1876 500 tons, worth on the average \$300 per ton. The two mines above named could produce, it is claimed, a hundred tons per day each, if the ores could be worked at home, or sold at what the owners consider a fair profit.*

The owners of the Rumley have, during the past autumn, formed a joint-stock company, including themselves and a number of capitalists in Philadelphia, for the purpose of erecting milling and smelting works at the mine during the next year. This mine alone could, it is claimed, keep a hundred stamps at work, and the Comet, with the dozen extensions east and west upon it, is estimated to have equal capacity.

The Boulder silver-district is certainly one of the most extensive known in Montana. The whole eastern side of the main range of the Rocky Mountains, from Helena southward through Lewis and Clarke and Jefferson Counties, including the Little Prickly Pear and Boulder Valleys and Ten-Mile, abounds in silver-quartz veins on almost every slope.

On the eastern slope of the Prickly Pear Divide, which is a high range separating the Prickly Pear and White Tail Deer Creek from the Missouri River, are many fine gold-veins, as the Blacker and Keating, Lead, the Iron Rod, the great gold vein at Saint Louis, and a hundred others, which have been profitable to their owners. For description of these, the reader is referred to my former reports.

* I must say in general, without meaning to apply the remark to this case more than another, that these estimates of the capacity of mines are usually, among our western miners, much exaggerated. Engineers will understand that the production of a mine cannot be doubled at will, except for a short period.—R. W. R.

MEAGHER COUNTY.

Several small gold-quartz mills have worked successfully in this county during the past year—one especially, at Duck Creek; but the principal mineral wealth of this county, so far, appears to be in its placer-mines. The celebrated Confederate Gulch, which yielded its millions in gold-dust when first discovered, is still paying handsome profits to its owners. Thompson's Gulch, Eldorado Bar, Cane, Avalanche, White's, New York, and Spring Gulches, American Bar, and the numerous other bars all along down to the Gate of the Mountain and Old Bear Tooth Mountain are yielding well. All along the Belt Range of mountains, north and east from Helena and across the Missouri River, promising silver, gold, and copper veins have been discovered, but not much developed.

From the Newlan Copper Mine, at Copperopolis, in Meagher County, Benjamin Kingsbury shipped during the season forty tons of ore to Baltimore, which gave $33\frac{1}{2}$ per cent. copper, and netted him, after paying all expenses, about \$25 per ton. He owns three veins contiguous to each other that are wide and appear to be permanent, and increase in value as they are sunk upon. In December he organized a company at Saint Louis, Mo., which will probably erect works to reduce these ores during 1876.

The gold-yield of Meagher County has not been far from \$350,000 for several years past, and the promise is better for the future, as small claim owners are selling out and consolidating with large owners, who are bringing in larger ditches. This is taking place, indeed, all over the Territory, and augurs an increased yield of the placer-mines.

GALLATIN COUNTY.

This has hardly been considered as one of the mining-counties heretofore, but is certainly the foremost agricultural county of Montana. Yet it contains some good mines. The large argentiferous galena mine on Sixteen-Mile Creek, mentioned in my last report, bids fair to fulfill all the promise of its first working, and considerable ore has been prepared for shipment to the East next year, to test its value.

The placer gold-mines at *Emigrant Gulch* and the noted *Clark's Fork* galena-silver mines, described in my last report, although on the Upper Yellowstone or its tributaries, are only accessible from Bozeman, in Gallatin County, and may be considered to belong to it.

The yield of Emigrant Gulch the past season has been about \$40,000 of gold-dust. The Clark's Fork mines show on the surface large quantities of galena and silver ore, very rich in galena—60 to 80 per cent.—and in silver bearing from \$40 to \$600 per ton, according to the tests that have been made. These mines are 10,000 feet above sea-level in the mountains, and 120 miles southeast from Bozeman, and accessible only on horseback. A company has been formed to begin their development. But it will take both time and money to make them profitable. The improvement of navigation on the Yellowstone would bring steamboats within 100 miles of them.

MADISON COUNTY.

During the year 1875 there was shipped by Wells, Fargo & Co.'s Express, from the Virginia City office, gold-dust to the amount of \$24,628, as reported by their agent, Mr. H. S. Howell. From the different camps within the county the following brief notes have been gathered:

Alder Gulch.—Last season was a favorable one for placer-mining, and it is estimated that the yield from Alder Gulch was nearly or quite up to the average of the last few years. Some portions of it have been worked out; but the prevalence of lower wages and the consolidation of many small claims under the control of a few large companies maintains the yearly product without material decrease. Several tracts of ground in the lower part of the gulch—considered of little value—have been purchased by Chinamen, and are evidently paying them well. With two or three exceptions, the mine-owners along this creek, a distance of 16 miles, have applied for United States patents.

Barton Gulch.—Barton Creek heads at the foot of Old Baldy Mountain, and just over a low divide from the right fork of Alder Creek. Acting upon the presumption that the source of the gold found in the bed of the latter was at its head, and that some of the precious metal would naturally find its way down the channel of Barton Gulch, considerable prospecting has been done in the latter, but with small returns. In the upper portion there is a scarcity of water, and in the lower part the bed-rock lies very deep; still the men at work in it are confident of ultimate success. On a right fork of this stream, Mr. Robert Williamson has discovered and opened a vein from which a considerable amount of good-looking quartz has been taken. A working test next spring will determine its value as a gold-ore.

Bivens Gulch.—In this gulch placer-mining has been systematically carried on, and large "clean-ups" are the results. The yearly yield is on the increase, and the gold obtained is of a fine quality.

Brown's Gulch.—Near the head of this gulch, Mr. M. D. Platner has been successfully treating the rich silver-ores of this district, in which are situated the Pacific, Black, Gould & Curry, and other lodes. By means of a rude but clever arrangement of quicksilver-tanks, steam is generated and the pulp submitted to its action. This suggests that, with proper facilities, these ores might be easily and profitably worked on a large scale.

The placer-mines in Brown's Gulch are being rapidly opened and pay good wages. Several claims are surveyed and advertised for patents.

California Gulch.—In this gulch the water is used to the best advantage, but the supply is limited, and many good claims are lying idle.

Copper Belt district.—This new district is at the south point of the Ruby Mountain, and takes its name from the first lode discovered, the Copper Belt. Several well-defined veins of low-grade copper-ore have been found. A sample forwarded to the Baltimore Copper Works was returned as copper-glance, free from antimony and arsenic, assaying 25.2 per cent. of copper, with no silver.

Harris Gulch.—The placer-ground in this gulch is worked so far as the limited supply of water will permit, and on the average pays very well.

Havana district.—In the Havana or Cherry Creek silver-district, work has been suspended on all but the two principal lodes, the Enselman and the Eberhart, both of which are looking very well. A considerable quantity of rich ore has been taken out, but the lack of capital to develop and erect the necessary works retards progress.

Hot Spring district.—In this district the Red Bluff, Silver Shower, and other lodes have produced largely, and it is expected that the product for the next year will be far in excess of this. The fine Midas mill, at Sterling, stands idle, but the Mallory and Olds mills, and the Red Bluff arrastra below, are constantly and fully occupied.

Idaho Gulch.—Idaho Creek heads at the west face of Old Baldy, and

empties into the Stinkingwater River above the lower cañon. Messrs. Barr & Heisrick have run a drain, are putting in a bed-rock flume, and expect to work this gulch during the coming summer.

Iron Rod district.—On the Iron Rod lode a tunnel 900 feet in length has been run for drainage and prospecting purposes, in addition to the usual amount of work. A new and rich discovery has been made in Hell Cañon above, and the camp is in a prosperous condition. Messrs. Dahler, Porter & Co. have a good 12-stamp mill at Iron Rod, and in Hell Cañon there is a 6-stamp mill and an arrastra, all driven by water-power.

Meadow Creek district.—In this district the principal lode is the Madisonian, formerly known as the Mother Hendricks, and now owned by Messrs. Merk & Yandes. On this vein a shaft has been sunk to the depth of 220 feet; levels have been run, and at the present time there are 1,200 tons of \$20 gold-ore on the dump. A tunnel has been run and a large steam-pump ordered for the drainage of the mine. These gentlemen have a 10-stamp quartz-mill on Meadow Creek, $2\frac{1}{2}$ miles distant, and a 5-stamp battery, driven by the hoisting-engine, at the shaft.

Mill Creek district.—Messrs. Cislser, Zinn & Co., the owners of the Broad Gauge lode, have erected at Brandon, $2\frac{1}{2}$ miles above Sheridan, a fine 20-stamp mill, built by Fraser, Chambers & Co., of Chicago. This Broad Gauge mine is a gold-bearing deposit deserving more than a passing notice. In the absence of foot and hanging walls, it cannot be properly called a vein. The ore, an ochre-colored earth, is found evenly deposited upon a hill-side, from which it is removed with pick and shovel. The average yield does not exceed \$7 per ton, but the ore is so easily worked that the mine pays monthly dividends.

Norwegian Gulch.—The placer-mines on this stream are extensive. During the past season a joint-stock company dug a large ditch 5 miles in length, through which sufficient water for ground-slucing will be brought.

Potosi silver-district.—This district, a new one, is situated in the range of mountains known as the South Boulder, at the head of Willow Creek, and bids fair to acquire importance. Work has been commenced on several lodes and some rich rock has been taken out; but the mines are difficult of access, and it is probable they will not be developed to any extent until arrangements have been made to treat the ore near the mines.

Rochester district.—This camp about holds its own, and keeps Dr. Gitchell's 10-stamp steam-mill pounding away on quartz from the few lodes worked.

Silver Star district.—Here there are 25 men employed, and the mines are looking better than ever before. There are two quartz-mills here, the Green Campbell and the Tripp & Ainslee, the former having 10 stamps and the latter 6. Mr. Charles Heineman has opened a new vein, called the Aurora, which is considered the best in the district, and has purchased of Tripp & Ainslee their water-mill, in which to crush the ore taken from it. The Green Campbell mill will probably be started on custom-rock from the other lodes.

Summit district.—The principal lodes in this district are the Oro Cache, Keystone, Rosebud, and Kearsarge. The Oro Cache is the only one worked. During the last summer this mine was prospected, and it is now supposed that another chimney of rich ore has been found. The Keystone and Rosebud are down to the water-level, and must be drained before any quantity of rock can be taken out. There are five quartz-mills in the district, all standing idle. The McClure Chilian

mill in Spring Gulch has been put in running order and will start in the spring. Application has been made to obtain patents for the Oro Cache lode and the North Oro Cache lode, with the McClure mill-site attached.

Warm Spring district.—The placer-mines of this district are located along Warm Spring Creek, which rises on the south side of Old Baldy and empties into the Stinkingwater River, of which it is the largest tributary, just above the second cañon. The creek derives its name from the many warm springs found upon its banks. During last summer the gulch was located through its entire length, about 7 miles, and three companies commenced operations; but as yet little progress has been made.

Washington Bar is on Meadow Creek, near its source in the South Boulder range, and pays moderately well. Mr. George F. Cope, who has invested money here, employs several men on the bar. A considerable part of the work this summer was done to get the mines in shape for next season.

Wigwam Gulch, on the Madison slope of Old Baldy, has been abandoned, owing to the great number of large bowlders encountered and the scarcity of water. It is possible that with increased mechanical facilities and water-supply this ground might be profitably mined.

Williams Gulch runs nearly parallel with Alder, and contributes a small stream to the Stinkingwater. Very many lodes have been located in this gulch; a few have been represented by labor done during the year, but none are regularly worked. The ore from these lodes is much like that in Brown's Gulch, near by. Placer-claims have been located in the bed of the creek.

Wisconsin Creek.—The lodes in this district are pretty well developed, and encourage the hope of many that this will make one of the best quartz-camps in the county. The Company lode of the Messrs. Noble continues to pay a handsome dividend, and other mines recently opened promises well.

The placer-mines in Wisconsin Gulch are worked to a greater extent and with better results than ever before.

MISSOULA COUNTY.

This County is situated in the northwest portion of Montana Territory. The principal streams are the Missoula and the Bitter Root Rivers, the latter a tributary of the former. The Missoula is a continuation of the Deer Lodge, being the stream formerly known as the Hell-Gate River. It heads in the Big Hole Mountains, and flows into the Pend d'Oreille Lake. The Bitter Root heads in the Bitter Root Mountains. The county is well watered, the mountains being full of small streams and springs. It is the best agricultural county in the Territory. In the Bitter Root Valley, not only large crops of grain, potatoes, cabbages, turnips, onions, and other vegetables grow, but tomatoes, melons, apples, crab-apples, strawberries, raspberries, gooseberries, currants, and other fruits are successfully cultivated. So successful is the agriculturist in this county, that spare labor nearly always seeks employment on the ranches, and mining receives but a small amount of attention. The result of farming is an almost certain success, while that of mining is exceedingly uncertain. There are also other causes that the mines in this county have not received a larger share of attention. Among these are the circumstances that followed the discovery of the Cedar Creek mines, of which I shall say more presently. Another is the hindrance to prospecting found in the heavy timber that covers the mountains

and fills the gulches, and the obstacles to gulch-mining presented by the immense volumes of water that fill the channels in the spring, and by the frequent want of good dumping-ground.

The principal mines, those of Cedar Creek, were discovered in November, 1869. Very soon afterward the report that rich placer-diggings had been struck in Missoula caused a great excitement in Helena, and early in 1870 a "stampede" to the new mines was the result. Large numbers of miners arrived at Cedar Creek to find deep snow and very little provision. Of course prospecting was next to impossible. Still they waited patiently, and while they waited every month added to their number. At last the spring opened, and then came the water, roaring down the creek in such quantities as to render work out of the question. Many left the camp never to return, but others persevered. The gulch was exceedingly rich, but also exceedingly expensive to work, and the mining property soon fell into the hands of a few large companies. Miners departed leaving their debts unpaid, and ruined merchants followed their example.

Among the miners who had "stampeded" to Cedar were many of the best prospectors in the Territory; and the fact that these men left the camp disappointed and with empty purses, has doubtless prevented many others from prospecting in Missoula County. At the present time the effect of the Cedar excitement is wearing off, and some successful prospecting has been done during the past year. Yet the mining interests of this county are still unfairly handicapped when compared with those of other counties in Montana.

Cedar Creek.—A very large amount of gold has been taken from the Cedar Creek Gulch and its tributaries. Claims extending from 50 above discovery to 76 above yielded from \$18 to \$300 to the set of timbers.* The principal companies now working are the No. 67 and the Home-Stake. The former company is at work on claims from 67 to 72 above discovery. The principal work was done in the years 1871, 1872, and 1873, during which period there was taken out about \$50,000 each year, at an annual cost of about \$30,000.

The Home-Stake Company is at work on Snow-Shoe Gulch, at the head of Cedar. This company is composed of Messrs. Caplice, Smith, Lynch & Kelly, who bought up the whole gulch last fall, (1874,) together with the water-privileges, for \$1,000, and have since expended in improvements \$1,000. These are "hydraulic" diggings. There is a flume 600 feet long, which will be increased in length 200 feet next year. It is a 16-inch flume with 9-inch grade. There is water for about three months in the year, running from 50 to 300 inches, miners' measurement. During the summer of 1875 these diggings yielded, with nine men at work, in ten weeks the gross sum of \$9,200, and netted the owners \$4,600. The proprietors claim, moreover, that between \$2,000 and \$3,000 was lost by robberies of the sluices. The wages paid are \$5 per diem, 8-hour shifts, and 7 days in the week. The company boards the men at \$9 per week. There is no feed for horses at Cedar Creek, but plenty of wood and water. Water for mining purposes is scarce at the head of the gulch in the autumn.

With the exception of the few claims now being worked, the mines

* This seems to refer to the timbering of drifts, run for purposes of extraction, in the auriferous gravel of the "pay-channel." It is a vague measurement; but, if my conjecture is correct, the "set of timbers" may perhaps be fairly assumed to represent 50 cubic yards of material removed. This would make the yield stated a very handsome but not an unparalleled one.—R. W. R.

are not remunerative on account of the cost of working, the depth of the ground, and the want of drainage.

Nine-Mile Creek is situated 25 miles nearly due west from the town of Missoula, down the Missoula River, on the right bank of which it enters as a tributary. The diggings are about 27 miles from the mouth of the creek. The creek runs first from west to east, then turns and empties into the Missoula, which runs from east to west. The gulch is heavily timbered and has very slight fall; but the diggings are shallow and tolerably easy to drain, prospect, and work. About $2\frac{1}{2}$ miles of the gulch are covered by patents, Barrett & Co. having a patent for 100 acres, and Dixon, Kime & Co. having a patent for 40 acres. This patented ground, ranging from 8 to 16 rods in width, was taken up in the fall of 1874. The gulch is claimed under locations for 5 miles below the forks of the creek, and each of the two main forks is claimed for 2 to 3 miles. There are also several short side-gulches claimed. All these claims are represented by annual labor. Barrett & Co. are working their ground, and are said to be doing well, probably taking out from \$5 to \$6 per day to the hand.

Dixon, Kime & Co. have just commenced to open their ground.

The two main forks of Nine-Mile Creek are called, respectively, Saint Louis Gulch and Eastash Gulch.

A Frenchman, who owned No. 19 on Eustash, recently bought out the adjoining claim (No. 20) for \$1,000, and now owns 600 feet. The claims are very rich, and have yielded as high as \$100 per day to the hand. One day during the week commencing August 16, 1875, 31 ounces of dust was taken out of No. 19. This dust is very fine in quality, selling at from \$20.50 to \$21.25 currency per ounce. During the same month a nugget weighing 5 ounces was taken from the same claim. In this gulch there are about 50 located claims of 300 feet each.

The First National Bank of Missoula bought from Nine-Mile district during the week commencing August 16, 1875, 80 ounces of gold-dust, paying from \$20.50 to \$21.25 per ounce.

At the point where Saint Louis Gulch and Eustash Gulch meet and form Nine-Mile Creek is the mining-camp of Montreal, with a population of about forty souls. The town possesses one hotel, four saloons, one store, two butcher-shops, two blacksmith-shops, one bakery, and two Chinese wash-houses. Wages range from \$4.50 to \$5 per day, and board costs \$8 per week. The grass is not good at the upper end of the gulch, but there is an abundance of water for a long mining-season and a plentiful supply of good timber.

Quartz Gulch empties into the Missoula River, on the left bank of that stream, about 52 miles west of the town of Missoula. This is a heavily-timbered gulch, with deep diggings in the channel, having slight fall, and being consequently very difficult to prospect or work. There are two districts in the gulch, called the upper and the lower. In the upper district there are from 50 to 70 located claims. Claims Nos. 15, 16, 17, 18, and 19, above discovery in this district, being "bar-diggings," were worked in 1872 with drifts from 20 to 30 feet in depth, and yield from \$10 to \$12 per day to the hand. These claims were all worked out in that year, with the exception of the lower portion of claim No. 15, which was worked out in the summer of 1873, paying well. Below No. 15 the ground has not been worked out, on account of the great quantity of water to be removed and the absence of fall for drainage. Messrs. Boyce & Co., McManus, and others are running a drain-ditch in the deep channel, and will probably commence sluicing this fall.

Messrs. McGraw & Co. have been prospecting the deep channel to a

considerable extent, but have, I believe, never reached bed-rock in the main gulch. While working on No. 20 above discovery, in the upper district, (difting,) and running across the mouth of a tributary gulch, in the summer of 1875, they struck bed-rock, and, according to general rumor, obtained as much as \$225 to the set of timbers. Messrs. William Losa and Joe Farrell, who had been prospecting on the bar for two years, have now drifted on the deep channel, and are said to be doing well. Bartz & Co., on No. 44, in the same (upper) district, are also reported to be prosperous. There are two flume companies in the upper and one in the lower district, but they only clean up twice a year, and nothing trustworthy can be ascertained as to the result of their labors. It is generally supposed, however, that they are successful.

Quartz Gulch was discovered in the fall of 1870. The gold-dust at the mouth is "flaky" and coarse, and very much resembles "Nine-Mile" dust, while at the head of the creek it is "heavy, well-washed, round gold." The richest ground is in spots, and the channel is deep and hard to work. There is plenty of water up to July, and afterward water is collected in reservoirs in sufficient quantities to run in day-time only. The gold assays, according to returns from San Francisco mint, \$19.81 in coin per ounce. The diggings in Quartz Gulch probably yield from \$20 to \$85 to the set of timbers, the lowest figure being the most common. Wages are \$5 per diem. The bar-diggings have been thoroughly prospected, but prospecting has only recently been begun in the deep channel.

In 1874, Mr. Richotte, a Frenchman, discovered a quartz-vein showing considerable free gold, but has not yet done much in developing it. The vicinity has not been prospected for quartz, but pieces of quartz containing free gold have been repeatedly taken out of the placer-mines.

Little Bear Creek is about three miles below Quartz Gulch, on the left bank of the Missoula River. It heads on the summit of the ridge between Quartz Gulch and Trout Creek. This gulch has been worked since the spring of 1870. The dust is .956 fine. Messrs. Foote, Holtz, and Quinn are the principal owners. The two former, who recently purchased half the interest of the latter for \$550, now claim 650 feet, and are working with results reported to be satisfactory.

Trout Creek is a left-bank tributary of the Missoula River, about 54 miles west of the town of Missoula. The mines were discovered in August, 1873, when about \$2,000 were taken out of a piece of ground 30 by 80 feet on the surface, and from 1½ to 3 feet in depth. This was done by Messrs. Fox & Co., who were prospecting on a point where the creek makes a turn, and struck bed-rock on the edge of the gulch. Bed-rock, however, has not yet been struck in the deep channel of the creek. The mines are deep, the fall is slight, and it is very difficult ground to drain. This makes prospecting difficult and expensive; still a large amount of work is in progress. Lewis & Co. are prospecting and running a drain half a mile in length. They have sunk 30 feet, but have not yet struck bed-rock.

In 1873, Cave, Lodus & Co. ran a drain 400 feet long on claims 17 and 18 below discovery, and attempted to raise the water by "China" pumps. After getting down 20 feet they were overcome by the water, and failed to reach bed-rock. In the same year Davis & Co. undertook to run a drain. They struck the rim-rock, and got good prospects, but could not reach bed-rock in the channel.

Mr. David Thompson also undertook to run a drain on claim No. 9 below discovery. He has not reached bed-rock, but is continuing work, though obliged to stop occasionally for want of means, and will go to

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work again in the fall. The principal tributaries of Trout Creek are Freeze-out, six miles from the head of the gulch, on the left-hand bank; Deep Creek, three miles below Freeze-out, on the same bank; and Windfall, quarter of a mile below Deep Creek, on the right-hand bank. Of these, Windfall is giving the most favorable results to prospecting and mining operations. The two other gulches are worked, and yield small wages.

These comprise the principal mines now known in Missoula County. There are also some Chinamen working on a bar toward the head of Bitter Root River, where they earn small wages (from \$4 to \$5 per day to the hand) for a very short time in the spring. It is said by many old residents, especially those who accompanied Governor Ashley in his journey through this county, that rich silver-ledges exist in the north-west corner of the county. Certainly some very good specimens are shown as coming from that region.

Mr. Alvin Lent, of Wells, Fargo & Co., gives the following as the shipments of gold-dust by express from the Missoula office during the years 1873, 1874, and 1875:

Months.	1873.	1874.	1875.
January.....		\$2,375	
February.....	\$5,000	2,750	\$3,000
March.....	7,550	4,700	3,400
April.....	3,590	7,000	
May.....	7,250	14,000	3,800
June.....	8,800	8,500	17,800
July.....	13,150	11,490	14,000
August.....	21,753	26,700	*7,600
September.....	11,300	5,000	
October.....	7,500	5,900	
November.....	8,320	13,250	
December.....	6,200	10,600	
Total.....	100,920	112,265	49,600

* This is up to August 22.

Mr. Lent estimates that 20 per cent. may be added to these amounts for the "gold-dust" that is taken out of the county by private hands, or forwarded through the mails.

The quality of the dust from different camps in the county, and the price paid in August by the Missoula National Bank, is found in the following list:

Name of camp.	Price paid in August, 1875.	Fineness.
Nine-Mile.....	<i>Per oz., currency.</i> \$21 00	.967
Quartz Gulch.....	20 75	.956
Bitter Root.....	19 00	
Cedar.....	20 75 to 21 00	.956 to .970
Trout.....		.974
Sunrise.....		.976

There is every reason to believe that Missoula County possesses her share of mineral wealth, but many circumstances have stood in the way of the development of her mines, and the county to-day remains almost unexplored.

CHAPTER VI.

UTAH.

This Territory was visited by my deputy, Mr. A. Eilers, in the summer and fall, and still later by Mr. T. F. Van Wagenen, who has furnished me with the latest accounts up to the end of the year.

The estimate of the bullion-product of the Territory has been arrived at from detailed data as to shipments of the railroads and of Wells, Fargo & Co.'s express, kindly furnished me at the end of the year by Mr. G. Billing, the proprietor of one of the largest smelting-works in the Territory, and from the values of ores and base bullion, ascertained through the principal ore and bullion buyers of Salt Lake City, Messrs. Hanauer and A. von Weise.

The descriptive text as to the condition of the mining-industry in Utah has been furnished by Mr. Theo. F. Van Wagenen, my deputy, Mr. A. Eilers, and several other professional gentlemen residing in Utah.

The product of gold and silver in 1875 was as follows:

	Currency.	Coin. (Gold 116.)
Silver in 284 tons of copper-ore, at 30 ounces per ton, at 30 cents currency..	\$2,556 00	\$2,159 82
Gold and silver in 16,330 tons argentiferous lead, at \$175 currency per ton.....	2,857,750 00	2,414,798 75
Silver bars	*657,763 00	538,909 73
Silver, value in 4,312 tons of lead-ore, 12 ounces per ton, at \$12.60 currency....	54,331 20	45,909 69
Silver, value in 1,000 tons of lead-ore, 100 ounces per ton, at \$110 currency.....	110,000 00	92,950 00
Gold-dust by express.....	†43,686 00	*35,800 00
Gold-dust by other conveyances.....	†4,368 00	†7,160 00
Total gold and silver.....	3,710,454 20	3,137,687 99
This amount can be separated into gold and silver, as follows:		
Gold in base bullion	\$138,805 00	
Gold-dust.....	42,960 00	
		\$181,765 00
Silver in base bullion.....	2,233,033 75	
Silver from all other sources.....	722,889 24	
		2,955,922 99
Total gold and silver		3,137,687 99

To this may be added the values produced in the Territory in lead and copper:

* Amounts obtained from Salt Lake office of Wells, Fargo & Co. by Mr. Billing.
† Amounts published in January, 1876, by Mr. Valentine, superintendent of Wells, Fargo & Co.'s Express. They were given by him as coin.
‡ Estimated.

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	Currency.	Coin.
Lead, 16,330 tons, at \$75 currency.....	\$1,224,750 00	\$1,034,913 75
Lead, value in 4,312 tons of ore, 55 per cent., at \$12.50.....	53,900 00	45,545 50
Total	1,278,650 00	1,080,459 25
Copper, 284 tons copper-ore, 20 per cent., \$1.15 per unit, \$23 per ton.....	6,532 00	5,519 54
Copper, 349 tons black copper, at \$100..	34,900 00	29,490 50
Total	41,432 00	35,010 04

RECAPITULATION.

	Coin.
Gold	\$181,765 00
Silver	2,955,922 99
Lead	1,080,459 25
Copper.....	35,010 04
Total metals	4,253,157 28

By comparing these figures with those of former years in previous reports, it will be seen that there has been a considerable decrease in 1875.

The cause of this large decrease is found in the depressed condition of the smelting business during the first half of the year. The prices for ore had been carried up in 1874 to a point which almost precluded any profit to home smelters, and as a consequence most of the works had shut down. This practically forbade the working of many of the mines, the ores of which would not bear transportation for long distances, but which, nevertheless, had yielded quite a large proportion of the annual production.

About May, 1875, however, the condition of the ore-market had improved greatly, so that Mr. Billing, of the Germania Works, first ventured to begin smelting. His example was soon followed by the Saturn Works, and at the close of the year eleven furnaces were in operation, and the ore-supply was as good as ever before, if not better. The ruling prices, though pretty well advanced, were not too high to leave a small margin of profit, and the custom-works appeared to be satisfied, on the whole, with the condition of things. A very important advance in the industry during this year was the successful introduction, in the fall, of Utah coke in the furnaces. Heretofore that class of fuel has been the most expensive item in smelting, costing from \$30 to \$35 per ton delivered, with all the disadvantages of purchasing at a great distance, (in Indiana or Pennsylvania.) In August the first car-load of San Pete coke was delivered to the Germania Works, and, on trial, was found to answer very well, though not as suitable as the Connellsville coke. The manufacturers (the Fairview Coal and Coke Company) found themselves immediately in receipt of many more orders than they could fill, owing to the fact that the coal-beds were 40 miles from the terminus of the Utah Southern Railroad, by a wagon-road not of the best quality. Late in the year the company was selling all it could bring to market at \$28 per ton, a figure which insured a handsome profit. It was the intention to construct either a tram-road or a better wagon-road from the railroad terminus early in the spring of 1876, and it was expected that coke could be delivered at Sandy or Salt Lake for not over \$20 per ton. The

samples first brought up to the city had the appearance of an excellent material, being clean, resonant, and sufficiently firm to bear the burden of a lead-furnace. There seems to be no reason to doubt that the San Pete coal will make a very good coke; and this fact may be expected to stimulate experiments with many of the other coal-deposits of the Territory, some of which produce an equally promising fuel.

Fully 75 per cent. of the product of metals in Utah comes from Parley's Park, Little Cottonwood, Bingham, and Ophir districts. In Camp Floyd, Tintic, Star, Beaver, San Francisco, and the numerous other southern districts a large amount of work has been done, but it has been mostly in the way of prospecting or developing. Great quantities of ore are already in sight in the mines of Southern Utah; but as it is, as a rule, of low grade, no very large production can be expected until railroad transportation is available. "Milling-ore," which can be reduced by amalgamation to nearly pure silver in the neighborhood of the mines, is not abundant in this Territory at present, and the bulkier product obtained by smelting even rich argentiferous lead-ores can scarcely bear the cost of wagon transportation over long distances.

The following reduction works have been in operation during the whole or part of the year:

Germania Works, 2 furnaces;* Jordan and Galena, 2 furnaces; Flagstaff Works, 2 furnaces; Saturn Works, 2 furnaces; Waterman Works, 2 furnaces; Chicago Works, 3 furnaces; McHenry Mill, Parley's Park; Pioneer and Enterprise Mills, Ophir district; New Jersey Arrastras, Ophir district; Fairview Mill, Ophir district.

Several of the more important smelting-works have been described in former reports. In the present report I give, as a representative case, the account of the Jordan and Galena Works and their operations for the year, for which I am chiefly indebted to Mr. G. P. Lockwood. These works have two reverberatory roasting-furnaces, built on a plan which may be called a cross between the English smelting and the old German roasting furnace. They are considered too short, and too high between arch and bottom, to be perfectly adapted to the work here required of them. There are, in addition, five elliptical shaft-furnaces, 60 by 30 inches in interior dimensions, 10 feet 6 inches from tuyeres to feed-door, 14 inches from tuyeres to slag-tap, and 24 inches from tap to sole. A sixth furnace is octagonal, 42 inches in diameter, 12 feet 6 inches in height, and like the rest in other dimensions. All are run with closed fronts, and have water-jackets, extending 14 inches below and 2 feet 6 inches above the tuyeres. Above the water-jackets the stack rests on pillars, like a Pilz furnace. The jackets are of riveted boiler-plate, giving an inner annular space 8 inches across, which is closed at the top by a plate riveted on. The water is fed into the jackets 1 inch below the top, and the discharge-pipe is in the top and rises 1 inch before turning. This keeps the jacket constantly full and prevents the accumulation of steam. The jackets are separate segments, held in place by a strip of thin band-iron. When the furnace is run down, and has to be cleaned, this band is loosened, and the front jacket is taken out. This arrangement is unsurpassed for convenience.

There are two engines, of 25 and 35 horse-power, respectively, four Mackenzie blowers, a sampling-mill for ores sent for sale, and a water-

* I do not vouch for the correctness of this statement as to the number of furnaces, not knowing by what rule they have been counted. The Jordan and Galena Works, for example, have indeed but two roasting reverberatories, but they have also six shaft-furnaces.—R. W. R.

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ditch $9\frac{1}{2}$ miles long, capable when in use of furnishing 250 horse-power, but now out of repair.

All the matter produced is saved and put again through the furnaces until it becomes rich enough in copper to be marketable. The cost of roasting matter and galena is about \$2 per ton for labor, and the same amount for fuel. The works were running but seven months during the year, and treated about 7,350 tons of ore, as is shown by the subjoined table.

Ores, &c., consumed at the Jordan and Galena Smelting-Works, Utah, during the year 1875.

Name.	Gross weight	Name.	Gross weight
	<i>Pounds.</i>		<i>Pounds.</i>
Jordan and Galena *	6,905,779	Deseret.....	131,460
Utah Queen.....	12,175	Mack.....	27,220
Belle.....	3,022	Coleman.....	12,361
Emily.....	10,667	Winnemuck.....	505,730
Cullen.....	10,129	Flagstaff.....	137,377
Manganese.....	15,980	Western Star.....	102,960
Grey Rock.....	13,500	Occident.....	6,330
Agnes.....	12,150	South Star and Titus.....	700,753
Sierra Madre.....	1,895	Thad. Stevens.....	21,700
Green Mountain.....	8,991	North Star.....	32,621
Bruno.....	14,690	Revere.....	78,000
Highland Chief of Little Cottonwood.....	157,875	Spanish.....	602,756
Samuel "A".....	6,950	Equitable.....	8,190
Samuel "B".....	7,016	Swansea.....	92,027
Evarts.....	1,507	Teresa.....	22,850
Tenderfoot.....	8,220	Sailor Jack.....	29,279
Blue Rock.....	9,090	Wellington of Big Cottonwood.....	199,715
"L" Ore.....	2,500	Full Moon.....	54,172
Tecoma.....	708,606	Old Cross.....	172,967
I X L.....	126,250	Prince of Wales.....	60,217
City Rock.....	55,168	Nes Perces.....	91,115
Yosemite.....	1,073,381	American Flag.....	53,610
Walker & Webster.....	107,500	Alabama.....	29,928
Ashland & Revere.....	508,407	Hidden Treasure.....	10,920
Toledo.....	188,168	Fred.....	6,327
Ophir.....	11,994	Victor.....	9,000
Ira.....	34,385	Dinero.....	12,580
Jim Fisk.....	38,204	Monumental.....	47,330
Richmond.....	200,238	Kinner.....	44,505
Mount Savage.....	44,675		
Victoria and Imperial.....	48,521	Total.....	14,700,555
Miller, (American Fork).....	19,043		
Reed & Benson.....	195,490	Coke, (Connellsville).....	1,791,672
Brooklyn.....	6,619	Charcoal, (bushels).....	140,649
Neptune.....	6,440	Limestone.....	1,919,100
Cincinnati.....	71,286	Iron-ore †.....	2,498,960
Vallejo.....	708,938	Scrap-iron.....	12,235

* Average assay of Jordan and Galena ore: Lead, 35 per cent.; iron, 10 per cent.; silica, 33 per cent.; silver, 16 ounces per ton.

† Hematite from Wyoming and Tintic.

The bullion product of the works was as follows:

	Spring campaign, January 1 to March 9.	Fall campaign, Sep- tember 13 to De- cember 31.	Total for 1875.
Lead.....pounds..	1,841,316	1,213,771	3,055,087
Silver.....ounces..	87,057.42	43,331.62	130,389.04
Gold.....do.....	514.647	264.602	779.249
Number of car-loads of bullion.....	83	58	141

The idleness of the works from March to September was due to the closing up of the business and its reorganization under a new company.

Much less ore is now shipped from Utah than in former years, partly on account of the improvements in home smelting-works, and partly because the business of smelting in Chicago has not been found very profitable. Still a large proportion of the high grades goes eastward. The two sampling-works of Oliver Durant and Scott & Anderson sampled and sold in 1875 nearly 30,000 tons of ore and 7,000 tons of base bullion. Of the first item all but a little over 5,000 tons was sent to smelting-works in Utah, the remainder being shipped east.

In round numbers, I find the production of the Territory to have been derived from the various districts in about the following proportion :

	Currency.
Big and Little Cottonwood and American Fork	\$1,140,000
Bingham	800,000
Ophir, (East and Dry Cañons)	812,000
Parley's Park	440,000
Southern Utah	518,454
	3,710,454

This amount has been produced from a total of nearly 150,000 tons of ore, showing the average value of the ore to the smelter and mill-man to have been in the neighborhood of \$24.75 per ton. The assay-value was larger by about 25 per cent.

Little Cottonwood district.—A very large number of mines in this cañon have been worked uninterruptedly during the year, and the results have been, as a whole, extremely satisfactory. As shafts and inclines have been sunk deeper on Emma Hill, and connecting-levels driven between the large claims, every development points to the conclusion that there is at least one large ore-bearing zone crossing the hill diagonally. Not improbably, several parallel zones exist. On the large "vein" are the Emma, North Star, Vallejo, South Star, Flagstaff, and probably the Reed and Benson. What are known as the Grizzly Flat mines, of which the Davenport is the most important, belong, doubtless, to another belt, not as yet so fully explored as the first. The hill on the south side of Alta, on which is the Iris tunnel, has been prospected considerably during the year, with good results. Below Alta, for a distance of three miles and on both sides of the cañon, numerous outcrops have been found, but the ores here appear to be more appropriate for milling than smelting, as they do not contain so high a percentage of lead as the ores nearer the head of the cañon. As they are also of rather low grade in silver, there has not been so much encouragement to mining here, since there is no amalgamation-mill in the immediate vicinity.

Alta City is now connected with the valley by railroads. The Wasatch and Jordan Valley Road (steam) extends about six miles up into the cañon. From that point a single-track mule tram-way has been built to the Emma Mine. All but the last four miles have been inclosed in sheds, and during 1876 the rest will be covered. Freights to Sandy are reduced \$2.50 per ton, and as the production of the camp is not less than 30,000 tons, this reduction represents a saving to the producers which is itself enough for a reasonable profit on a number of mining enterprises.

It has been noticed by smelters in the valley that the percentage of lead in the ore is not as large as formerly, and that the percentage of iron is slightly greater. It would be hasty to conclude from this (as some have done) that the character of the ore on Emma Hill (from which place most of the product is obtained) is changing as depth is

gained, though this is perhaps not unlikely to occur. But the fact probably is that much more low-grade ore was shipped last year than previously, and a good deal of this has been milling-ore.

So far as an intelligent understanding of the geology of Emma Hill is concerned, the developments made in the Bay City tunnel late in the year are the most important of the year's operations. The company running this tunnel had driven it 1,400 feet without encountering any large or promising bodies of ore until late in December, when, according to surveys almost directly underneath the workings of the North Star and of the Emma Mines, a large body of ore is reported to have been struck. It seems quite probable that this is a continuation of the ore-channel above, and the circumstance affords great encouragement to those who had become skeptical of the permanence of the deposits in Little Cottonwood. The head of the tunnel is fully 1,200 feet (measured on the dip of the rock) beneath the surface, and the general character of the country-rock remains substantially the same as it was at and near the surface. It is the intention of this company to prosecute work until the mountain shall have been bored through, and Big Cottonwood Cañon reached. It is believed that other ore-channels exist beyond those of the Emma.

The Emma has remained idle the entire year. There are many among the miners and residents who confidently assert the abundance of ore in the mine, which can be taken out with great profit under good management. The unfortunate troubles into which the mine has fallen do not give promise of any immediate resumption of work. In the winter of 1874-'75 a portion of the ore-house and concentration-works was carried away by a snow-slide, and it will now require a considerable outlay to put the surface plant in working order.

The North Star and Bruno was sold late in the year for \$100,000 to a Chicago company. Since that time it has been producing on an average about 10 tons daily of very good ore, and during the coming year it will probably become one of the largest producing mines in the district. The ore is of average grade, and occurs in large bodies.

The Flagstaff at the close of the year had been sunk to a depth of 450 feet below the tunnel. A fine set of hoisting and pumping machinery has been erected, at a cost of about \$30,000, which is operated by compressed air. The engines for compressing the air are located at the bottom of the hill, and the power is conveyed to the mine through a 4½-inch conducting-pipe, at a pressure of 90 pounds to the inch. This pipe is 2,000 feet long and leads to a storing tank at the mine 4 by 10 feet in size. The hoisting-engines are double, 10-inch cylinders, 12-inch stroke, with a 6-foot reel, around which is wound the 2½-inch cable. The latter has a tension of 35 tons, and the engines have a capacity of raising 25 tons an hour from present depth. The tanks and pipes are capable of holding 374 cubic feet of air. The exhaust is emptied at the bottom of the mine, thus affording excellent ventilation. As this mine, in common with many others in the vicinity, is involved in litigation, no official statement of its product during the year is available. I believe it has been about \$350,000.

The South Star and Titus Mine is one of the most extensively worked claims on the hill. Its underground workings are a labyrinth of tortuous drifts and chambers, slopes, winzes, and shafts, the equal of which can only be found (if at all) in some others on the same hill.

In the Vallejo Mine the incline was 630 feet from the surface at the close of the year. The mine has produced quite steadily, although not largely. A good deal of prospecting has been necessary. The wire

tram way has worked admirably, even in the deepest snows. A portion of it, however, was slightly damaged in a slide last winter.

The Reed & Benson has been worked under lease mostly, and has produced a fair quantity of ore.

The Golconda, which was discovered in June, developed from the start a fine body of ore, and paid, from the beginning, every expense connected with mining. It has been opened by about 200 feet of levels, and showed at the close of the year large quantities of reserves.

The group of mines which includes the Prince of Wales, Wellington, and several others, has been consolidated under one company, controlled by the Walker Brothers, of Salt Lake. The deposit seems to be a stratum, is very regular in its dip and width, and carries richer ore than the majority of mines in the cañon. Throughout the year from 70 to 125 men have been steadily employed, and a large amount of ore has been extracted. A fine set of hoisting-machinery has been erected, at a cost of \$30,000. Steam-power is used, the necessary water for the boilers being forced up from the gulch, nearly a mile off, through 2-inch iron pipes. An underground tram-way, 1,800 feet in length, has been laid, on which the ore is carried to a point down the slope of the hill and beyond the reach of the heavy snow-slides, that have during former winters so seriously impeded shipments. At the close of the year the mine was shipping about 18 tons daily.

The Davenport, which, so far as reputation is concerned, is the most important mine in the vicinity of Grizzly Flat, has been idle nearly throughout the year. In its vicinity the Dexter, King of the West, Vanderbilt, Darlington, Olive, Regulator, Imperial, Evergreen, and a number of other claims have been worked with encouraging results, and some ore has been shipped. About 1,000 feet of shafting and drifting will represent the amount of work done.

The Emerald Company struck a large body of ore in the Iris tunnel early in the year, and immediately began the erection of a surface tram-way from the mouth of the tunnel to the foot of the hill. It is 1,600 feet in length, well laid, and railed with T-iron.

The Equitable tunnel is reported to have encountered good ore during the fall, but, so far as I can ascertain, none has been shipped.

Of the new discoveries the most important are the Swansea, Golconda, North Star, Gladiator, and Kinney.

American Fork district.—But little work was done in this cañon during the year. The Miller smelter, upon which the miners depended largely for the reduction of their ore, has been idle through the entire year, and though several times there were reports that it was to be re-opened, that much-looked-for event has not yet occurred. Nevertheless, a fair amount of ore has been shipped to Sandy and elsewhere. The mines producing most have been the Wild Dutchman and Sunday. Occasional lots of ore have been shipped from the Miller and others, but it has been the work of prospectors or transient leasers.

The condition of the mines at the close of the year was, therefore, not very different from their condition in December, 1874. The following data represent the state in which they were found by Mr. Van Wagenen: The Miller Mine is opened by about 2,500 feet of tunnel-work, cutting the deposit at six different points on the hill. The underground workings are a complicated combination of shafts, inclines, levels, and stopes, which cannot be clearly described in words. A considerable quantity of ore is exposed, worth, perhaps, \$30 to \$50 per ton.

The Pittsburgh Mine has been developed by about 2,000 feet of shafts and levels, and an immense body of low-grade ore has been exposed.

Although capable of yielding from 50 to 100 tons per day, it is unworked, probably on account of the low grade of its ores, which cannot be profitably shipped out of the district.

The Wild Dutchman is now reached through a tunnel 320 feet in length. It is developed pretty thoroughly by several thousand feet of workings, and has produced steadily throughout the year.

The Sunday Mine is a vein in quartzite, carrying ore rich in gold. The mine was worked for some time before the true value of the ore was discovered. This did not occur till late in the year, and subsequently a small lot of about 15 tons was shipped to Sandy, which yielded over \$500 per ton. From reports received subsequent to Mr. Van Wagenen's visit, I judge that the lot referred to must have been rather an accidental bonanza in the vein, for the second shipment was as great a surprise to the owners as the first, but, unfortunately, in the opposite sense.

Among the other numerous mines of this cañon which are in a promising condition, mention may be made of the Live Yankee, Roessler, Bredemeyer No. 2, Silver Dipper, Wyoming, Caribou, Southern Spy, Comet, and Bullion.

Parley's Park district.—The Ontario is the only mine of note on which work has been prosecuted during the year. There have been numerous prospects in the vicinity, but none, as yet, have attained great prominence. Among them may be mentioned the California Central, Bullion, Flagstaff, Walker & Webster, Pioneer, McHenry, Switzerland, Iron-Horse, General Washington, Hawkeye, Daniel O'Connell, Mountain Top, Great American, Piñon, and Pirate. From most of these ore has been taken and shipped during the year, and some have produced considerably. Their production has, however, been intermittent.

The shaft on the Ontario Mine has been sunk to 400 feet, and the ground explored on either side for a distance of 300 and 500 feet. The vein is a contact one, having quartzite for the foot-wall and porphyry for the hanging. It has an average width of 2 feet, with an ore-seam that has so far shown great regularity. It carries little or no galena, and is a true milling-ore. The mineral is treated in the McHenry Mill by amalgamation. The mill went into operation in June, and has been producing steadily since, having a capacity of 20 tons per day.

The extensive developments on the mine have shown it to be a vein of great promise. The explorations of the year have gone far in advance of the production, while the latter has been much greater than are the company's milling facilities. As a consequence, it is estimated that from \$500,000 to \$1,000,000 of reserves are in sight, and the owners of the mine are expecting to lease and put in operation the Marsac Mill, which will exactly double the reducing capacity. As the valuable character of this vein has been shown, there has of course been much search after its extensions, and it is thought that these have been found in the Hawkeye and Irish-American.

Although the McHenry Mine has never yet been profitably productive, the company owning it proposes to explore it still farther, and are sanguine of ultimate success. Not less than \$300,000 has been expended on the mine and mill. The latter is employed in treating Ontario ore.

The Hawkeye has been developed to a depth of 65 feet, and opened by a 140-foot tunnel.

The Switzerland has a shaft 130 feet deep, with good ore at the bottom. This vein is also cut by a tunnel 175 feet long.

The General Washington shows a good vein of ore of fair grade. A tunnel is being run that will cut the vein 350 feet below the surface.

The Great American has reached a depth of 60 feet, and is quite promising.

The Walker & Webster has produced steadily during the year, shipping its ore, which is suitable for smelting, to the Utah Sampling Works.

Two tunnels, the Washington and the Minnesota, are cutting under the mountains of this district. The former, which is situated a mile west of the Ontario, cut a very promising vein during December, on which work will be immediately commenced. The latter, which is something over 500 feet long, has, after passing across three veins of minor importance and size, intersected a crevice about 10 feet in width, which carries a good body of ore. This property is owned by Dr. Reed, of Wyoming, and promises better results than most enterprises of a similar nature.

This district is under much disadvantage in having no smelting-works. There is apparently an abundance of galena-ores, carrying from 15 to 50 ounces in silver per ton, in the claims of the southern and southwestern part of the camp, which will not now pay for treatment if the ore must be transported to Salt Lake, but which can be made quite profitable if treated in the vicinity. Several parties are considering the erection of works here in the spring.

Bingham, or West Mountain district.—The mines of Bingham Cañon produced last year a total of about 30,000 tons of ore, carrying silver-lead and a small quantity (merely nominal) of gold. The assay-percentage of lead in such ores of this district as come into market is usually estimated at 45. During 1875 so large an amount of milling-ore was produced, and so many new discoveries had been made of this desirable class of mineral, that at the close of the year arrangements had been concluded to erect amalgamation-works at the mouth of the cañon or at Sandy, the main inducement for their erection being the large and steady supply of ore attainable from the Mayflower Mine, which is now shipping all the way to Reno, Nev. Bingham Cañon annually produces a little gulch-gold. The first discoverers of the gulch extracted a large amount of dust from the creek, but the bars were not deep enough to last long, and are now but little worked. The amount extracted in 1875 did not exceed \$33,000. Several companies have been at work in Bear Creek, and some Chinamen have been busy in the main gulch.

The ores of the cañon are treated mostly at Sandy and at the Germania Works. At Bingham Junction the Sheridan Hill Works were running during part of the year.

Early in the year the Winnamuck Company shut down its smelter, and since then it has been shipping ore. The production of the year has been small, and the work has been mainly prospecting. In following the vein into the hill much barren ground has been encountered. Explorations have been continued in that direction perseveringly and are still going on; but more encouraging results have been obtained in sinking below the huge ore-body which was the source of the large former production of this mine. It is now pretty well decided that the outcrop on the other side of the gulch and some little distance up the creek, known as the Dixon, is the same vein as the Winnamuck. The ledge has suffered an unusual amount of distortion, and is probably much faulted in the gulch. The company determined, toward the end of the year, to sink a shaft at the bottom of the hill, and, when this had reached sufficient depth, to drift both ways on the ledge and thereby test whether the Dixon is really an extension, or whether the lode is lost in the gulch. This work is now in progress, and suitable hoisting and pumping ma-

chinery is to be built over the shaft. In other parts of the mine about 20 men have been at work.

The Dixon (supposed to be an extension of the Winnamuck) has been opened by a shaft now between 150 and 200 feet deep. In December a large body of rich ore was reported to have been struck. This mine is worked by the Winnamuck Company. An extension still farther north on the same vein has been located, and is said to promise well.

The Spanish Mine has been worked steadily throughout the year, and has maintained a fair production. For many months past more attention has been paid to placing the property in better shape by replacing the old timbers with new square sets than to taking out ore. This has been rendered necessary by the dangerous condition in which the mine was found by its present superintendent, Mr. W. W. Gallagher. In retimbering bad ground and clearing away dangerous *débris*, much valuable ore has been found that had escaped previous notice. There is no lack of good mineral in sight at present. Any attempt to designate the position of the exposed bodies of ore would be unintelligible to the reader, and can only be understood by surveys, as the mine belongs to that class of subterranean quarries consisting mainly of galleries running in all directions, in which the most expert mining-engineer will be lost without his compass. This method of extraction finds, however, in the nature of the ore deposit and the economical conditions of the locality a plausible, perhaps a wholly valid, excuse. The expense of timbering is its great drawback. This is now executed in an extremely creditable manner.

The production of the Neptune and Kempton property has been about 4,000 tons during the year. Ten times that quantity could have been extracted without opening any new ground. The main work of the year has been the driving of the deep tunnel, which is to cut the lode 700 feet below its outcrop. To meet this a shaft has been sunk on the vein and on the line of the tunnel. At the close of the year the tunnel was thought to be in close proximity to the vein, but had not yet reached it. In many parts of the mine the reserves of ore at hand are very great. In that portion around the Galena chamber the body of mineral is apparently 20 feet in width and of excellent quality. Not far off considerable excitement was caused by the discovery of a body of black oxide of copper, which at one place was 14 feet in width. In October the lessees of the mine leased the Sheridan Hill smelter at Bingham Junction, and smelted their own ore during the remainder of the year.

The Jordan Mine has been worked intermittently during the year. When working with full force its production has ranged from 30 to 40 tons a day. The mine shows plenty of ore in sight, and is capable of maintaining the above production at least.

The Utah has been idle during the entire year, excepting that a few parties have been gleaned what little mineral was left in sight.

The Mayflower has reached a depth of 500 feet, and as depth has been gained there appears to be no diminution in the abundance of ore. Expensive hoisting-works have been erected during the year, and the mine throughout is in excellent condition. During the fall a sample lot of the ore, which is milling-ore, comparatively free from lead, was shipped to Fairfield for trial in the mill at that place. The trial having proved a success, the mill is to be removed to Sandy, and the ore treated there instead of being shipped to Reno, as has heretofore been the case. The ore from this mine is worth from \$50 to \$70 per ton. The production during the year has amounted, as nearly as I can learn, to 3,500 tons.

The Yosemite has developed during the year an extraordinary display of ore. The body of mineral which appeared on the surface has held out almost without interruption to the bottom of the shaft, which is a little over 400 feet deep. In November a body of ore was struck which has proved of great lateral extent, and is from 15 to 25 feet in width. It is of rather low grade, but, owing to the quantity in sight, can be mined at a good profit. The yield of the mine has averaged 15 tons per day, the ore being worth in the neighborhood of \$25 per ton.

The Last Chance has been producing regularly. At the end of the year the tunnel had reached a length of nearly 1,000 feet, and was expected shortly to cut the vein.

The Nez Perces Chief has not been doing much during the year, but is expected to re-open early in the spring.

The Aladdin has shipped during the year about 1,000 tons of very good ore.

Among the new discoveries of the year the Albino, Live Yankee, Winnebago, and Tiewaukie are most prominent. A large number of the older mines have been worked with satisfactory results, among which may be mentioned the Revere, Ashland, Bully Boy, Live Pine, Sacramento, Williams, Montreal, Hamlin, and Owyhee. The cheap freights that result from the successful operation of the Bingham Cañon Railroad (narrow gauge) permit the profitable mining of ore of very low grade, and several mines have thus been continued in operation which otherwise would have been forced to shut down.

Ophir district.—This district, including Dry and East Cañons, is undoubtedly one of the best in Utah. Dry Cañon has produced very heavily during the year, and the mines now working are in promising condition. In East Cañon the work has been rather in the nature of prospecting. The rich but precarious deposits of Lion Hill and Chloride Flat have attracted numerous sanguine explorers, but have generally failed to pay for development. Yet the product of much desultory extraction has been the shipment of a considerable quantity of ore, some of which has been of very high grade.

In the Chicago and the Waterman Works, at Rush Lake, almost all the ore of these camps has been treated. The former has been supplied mainly by the Queen of the Hills and the Chicago Mine, but has bought all custom-ore offered. The works were running during the greater part of the year. The Waterman Works were running steadily during the last half of the year almost entirely on Hidden Treasure ore. The Walker Mill at Ophir made a short run during the summer, and turned out about \$20,000. The amount of ore treated was 1,600 tons. The Enterprise Mill and Mr. Mayer's arrastras also did a few months' work on ores from East Cañon.

The East Cañon mines produced in 1875, as nearly as can be ascertained, not less than 7,500 tons of ore. Of this amount the Ophir Company (Miner's Delight Mine) produced 3,000 tons, and the remainder came mainly from Lion Hill.

The Ophir Company's operations were not satisfactory. A very large amount of development was done, but the ore found was of so low grade as to be unprofitable. The explorations have been pushed extensively in every direction upon the claim, but with only a moderate degree of success. During the year considerable ore has been extracted and sold. Toward the end of the season it was thought that the incline was approaching a better class of material, and later advices show that the belief was partially realized. The ore taken from the Miner's Delight during the season has averaged about 20 ounces

silver and 10 per cent. of lead. The first-class ore, of which but a small quantity was shipped, did not return more than 35 ounces silver and 25 per cent. lead. Over 400 square sets of timber were put up in the mine during the year.

On both slopes of the cañon, from base to crown, the mountain-side is dotted with prospects and mines. Hardly 10 per cent. of the claims located are worked to a depth of 50 feet, and even a much smaller proportion than that would include all operating on any well-defined vein.

On the top of Mountain Lion Hill is a group of mines that have been worked during the year with tolerable persistency. The country-rock is a limestone, between the strata, and in the seams of which occur argenteriferous galena, and often horn silver. Some extraordinarily rich, but small, deposits of the latter mineral have been found. The veins, or lines of deposit, cross each other at every conceivable angle, and, as a consequence, the tenure of mining-property is not well defined. The most prominent of these are the Tiger, Monarch, Zella, Mountain Lion, Silver Chief, Chloride Point, and Sunnyside. The ores average from 2 to 10 per cent. of lead, and are said to carry, besides the chloride, some bromide and iodide of silver.

On the northern slope of the cañon the mines appear in a more regular formation, often occurring as defined zones, and carrying large veins of ore. Of this class the San Joaquin and Little Peru are the most prominent examples. The Jim Fisk, Bonanza, California Boy, and Grey Rock are others of minor note. The ore from these claims carries often considerable arsenical pyrites and manganese.

The two great mines of Dry Cañon—the Hidden Treasure and the Flavilla—have well sustained the reputation of the district. Both mines have been worked uninterruptedly during the year, and, so far as a display of ore in reserves is concerned, are in magnificent condition.

The Hidden Treasure is now developed to a depth of 1,100 feet below its outcrop. A tunnel has been run into the hill which cuts the vein 900 feet in depth, and through which, before long, the entire extraction will be carried on. The vein appears to be a contact layer. It is not very regular, but has usually an upper wall of slate and a lower one of limestone, between which the ore lies, varying in width from 6 inches to 15 feet. The production has been from 30 to 40 tons daily throughout the year, a figure which could now easily be trebled, as the reserves in sight are enormous. The mine is opened very extensively, though rather irregularly. In November a chamber was being cut on the tunnel-level at the head of the main shaft, in which large hoisting-engines were to be erected. Other improvements were being made in order to put the mine in better form than it has shown for several years past. Toward the close of the year the shipments had increased to 50 and 60 tons daily.

The Queen of the Hills and Flavilla, which are now the property of the Chicago Company, are in a very flattering condition. The vein (a layer) dips into the hill at a very slight inclination, and has been followed downward on this incline for 600 feet. From this central work three inclined levels branch off to the east and two to the west, the five having a combined length of 2,600 feet. Between these a vast amount of stoping has been done, especially in the upper "backs" near the surface. The ore ranges in width from 3 to 12 feet, and yields at the mill from 40 to 50 ounces in silver and 30 per cent. of lead. The shipments have averaged about 30 tons daily throughout the year. The surface works of the mine are situated about 300 feet above the "grade," or stage-road, which connects Dry Cañon with the valley. A surface

tram-way has been laid on the slope of the hill from the mouth of the mine to the road, and ore is carried down in cars and loaded directly into the wagons.

In driving the upper levels east in this mine, a complete break in the vein was found at a distance of about 800 feet from the shaft. The entire formation appeared to be completely cut off by a cross-course or a fault in the country-rock. After the breast of the level had been driven ahead several feet in the barren rock without finding anything, it was determined to sink a shaft on the edge of the slip. This was done, and at a depth of 20 feet the vein was found again as perfect as ever. On being followed another break was found, and again the same expedient was adopted with a similar result. At the time of Mr. Van Wagenen's visit the level had been driven on for some distance beyond the last fault, and the vein still continued regular. From other explorations above and below, it is likely that this fault crosses the entire mountain and breaks the vein in its path, giving it a displacement of about 22 feet.

The Chicago, which has reached a depth of over 1,200 feet, has been worked continuously throughout the year, but not extensively. It has produced a fair quantity of ore.

The Mono, once a famous mine of Dry Cañon, and supposed to be as good now as ever, has been idle during the entire year, excepting that several parties of lessees have been exploring the abandoned upper workings in search of what ore was left. The vein is reported to be lost, and it is likely that a break or fault has been met with similar to that found in the Queen of the Hills, and perhaps not more formidable.

Of the other mines in the cañon, the Sacramento, Poor-man, Rattler, Dexter, Mayflower, Fourth of July, Emporia, and Eureka have been worked to a considerable extent, and given promising exposures of ore, with some actual production. Beside these a large number of claims have been worked which on account of the insignificance of their development, cannot receive special mention this year.

Dry Cañon will next year be better provided with smelting facilities than it has been heretofore. A movement is on foot to open the old Jacob Smelter at Stockton for custom-work. Mr. John Longmaid, of Ophir City, has charge of the business, and in order to secure to his company a steady supply of ores, has leased a couple of mines in East Cañon that are showing good bodies of galena-ores.

SOUTHERN UTAH.

Under this head are embraced the districts lying on the lower extremity of the Oquirrh range, and between it and the Arizona line. The valleys of Utah have a general north and south trend, and are approximately parallel with each other. Following them toward the south, they lead gradually and imperceptibly into the mesa and cañon lands bordering on the Colorado River. To this boundary-line the prospector has pursued his work, and numerous mineral-districts have been discovered, some presenting an abundance of lead-ores and others a preponderance of copper. All are more or less argentiferous. The most important are Camp Floyd, East and West Tintic, Tom Paine, Star, San Francisco, Granite, and Bonanza City districts.

The distance of these localities from railroads and the average low grade of their ores have retarded their development. Quite a number of mills and smelting-furnaces exist in them, hardly a camp being without a reduction process of some kind; but none have made steady runs,

and it is necessary to transport the ores to Sandy or Rush Lake at considerable expense.

Camp Floyd district has produced but little during the year. Its ores, mostly of low grade, (from 15 to 30 ounce,) must be reduced by milling in the vicinity of the mines. The character of the silver-ore deposits also forbids profitable mining except on a large scale and with the aid of capital, there being no distinct veins, but rather an impregnated stratum of quartzite of great width, in the cavities and seams of which chlorides, bromides, and other argentiferous minerals occur. Quite a number of minor claims have been working during the year, among which may be mentioned the Queen of the West, Sparrow Hawk, and Jenny Lind. In the latter cinnabar has been found.

Tintic district, located about 70 miles south of Salt Lake, has improved but slightly during the year. The Utah Southern Railroad is now within 18 miles of East Tintic, while the Utah Western has been surveyed directly through West Tintic, and in a couple of years will doubtless be extended at least so far on its road to Pioche. At present the terminus of the latter road is some 60 miles away, and the former offers the cheapest route for transporting ores to market.

Eureka Hill, on account of the richness of its ores, has attracted more prospecting and development than any other section of Tintic district, and here most of the work of the year was done. The principal mines are, however, still in litigation and idle, (that is, the company is doing no systematic work,) but various lessees have been taking out ore from some of the old works, and some adventurers have been pursuing their vocation on abandoned properties, so that there has been at all times during the year a small but steady production from the camp. The facilities for reducing ores in the camp are represented by four mills and three smelters, all of which have been in operation for a short time during the year. But they have been run with such irregularity and under so many managements that it is impossible to learn anything definite of their operations. The largest part of the production of the mines has been shipped away as ore; but, besides this, there have been shipments of silver bullion, lead bars, and copper-matte.

The Crismon and Mammoth Copperopolis mines have not been worked to any extent during the year, and are practically in the same condition as at the close of 1874.

Among the promising *working* properties of the district are the Bullion, Sunbeam, Brooklyn, Bowers, Morning Glory, Shower, and Gold Hill mines. These have yielded considerably more than one-half of the ore produced, the remainder having come from the work of lessees or poachers, operating intermittently and on a small scale.

Tom Paine district is one of the new discoveries of the year, having been located in the fall. It is 180 miles south of Salt Lake and 108 miles from the terminus of the Utah Southern Railroad. The locations of promise are the Silver Dipper, Blue Jean, Munroe, Hidden Treasure, Mono, Bully Boy, Ingersoll, and Liberal. The ores are galenas and carbonates of lead, carrying from 15 to 40 ounces in silver. Some rich chlorides have also been found.

Star district is slowly developing a regular production. The Sherman smelter, which has been in frequent operation during the year, has treated a portion of the ore produced, but much more has gone to Sandy. The two great mines of the district, the Rebel and the Big Bonanza, have together produced during the year, as nearly as I can ascertain, about 3,200 tons of galena and carbonates. In the workings of the former, which are quite extensive, an immense body of mineral is ex-

posed, and the property is universally held to be of great value. Of the other mines of the camp, the Rainbow and the Minnesota are the most noteworthy.

In *Granite district* about half a dozen mines have been under work during the year, with moderate success, and of *San Francisco district* the same may be said. What has been done in both has been done in the way of development, and with little or no outside aid.

Bonanza City district.—This district, of which Bonanza City is the center, is in Washington County, about 20 miles south of the southern rim of the Salt Lake Basin. Prominence was first given to the district by the discovery of petrified wood, in the seams of which silver chloride and native silver occurred. Further explorations demonstrated that the formations around the city were highly metalliferous, and the camp is now, considering its remote location, one of the most promising in the Territory. The formation is said to be mainly sandstone, but it is probable that quartzite is the predominating rock. There are numerous veins of considerable regularity, and also localities where the formation is impregnated and without system. The ores are, so far, chlorides and bromides, more or less mixed with lead, arsenic, iron, and copper, the latter being the most abundant of the baser metals. Some of the ore is extremely rich, milling from \$300 to \$1,200 per ton, according to the care with which it is selected or dressed. As yet there are no reducing-works on the spot, but it is expected that in 1876 several mills will be built. The existence of rich mines was not known till the fall of 1875, and consequently the amount of development has been small, though the value of such ores as were shipped amounted in total to between \$10,000 and \$15,000. The most noted claims are the Pride of the West, Susan, Tecumseh, and Buckeye.

The Grand Gulch Copper Company, having a mine across the border, in Arizona, has erected a furnace near Saint George, in Utah, and will attempt in the coming year to smelt the abundant and rich copper mineral from that claim. The lode has not been developed additionally during the past year, but is reported capable of a large production from the surface.

CHAPTER VII.

COLORADO.

The reports which have been furnished to me in regard to the production of Colorado Territory during 1875 vary somewhat, but not sufficiently, so far as totals are concerned, to render them untrustworthy.

As the values in all business transactions in Colorado are expressed in currency, the statisticians of the Territory have followed the general custom; and I have therefore had to reduce the important amounts to a gold basis, taking gold at the average of \$1.16 for the year, in order to bring them into harmony with my previous estimates.

Mr. T. F. Van Wagenen furnished me at the close of the year with a report on the condition of the mining-industry at that time. This report, the notes of my deputy, Mr. A. Eilers, who visited the Territory twice in the summer, and various information kindly furnished to me by different professional gentlemen during the year, constitute the material upon which the present report is based.

Mr. Van Wagenen includes in his report the following exhibit of production, which I adopt as probably nearest to the truth, giving the gold values of my informant's currency figures:

	Currency.	Coin.
Gold-dust and retorts	\$1,641,109	\$1,414,676
Gold and silver bars	2,868,844	2,472,941
Ore shipped from Territory	1,416,000	1,220,572
Gold consumed at home	150,000	129,300
Total gold and silver	6,075,951	5,237,470
Copper	75,000	64,600
Lead	800	689
Total metals	6,151,751	5,302,810

Arranged according to counties, this yield appears as follows:

	Currency.	Coin.
Clear Creek County	\$2,110,802	\$1,819,598
Gilpin County	1,763,985	1,530,555
Park County	758,000	653,396
Boulder County	558,000	480,996
Fremont County	274,200	201,880
San Juan and southern mines	400,664	345,372
Summit County	78,000	65,512
Lake County	100,000	86,200
Other sources	150,000	129,300
Total	6,151,751	5,302,810

The gold and silver production, \$5,237,469.76, shows a decrease of over \$120,000 as compared with the previous year, the reason for which

may be readily found in the unfortunate litigations at Georgetown, which stopped several mines effectually.

The coal-production during the year is calculated by Capt. E. L. Berthoud at about 75,000 tons, worth at the pit's mouth \$225,000.

Dividing the above yield of \$3,237,470 into gold and silver, as well as the insufficient data furnished me will permit, we have the following.

Gold	\$2, 224, 568
Silver	3, 012, 902
Total	5, 237, 470

Mr. F. Fosset, of the Central City Register, who, to judge from various articles written by him on the subject both in the Central City Register and in the Engineering and Mining Journal, appears to have paid much attention to the yield of last year, gives in one of his latest articles the production in currency as follows:

	Currency.
Clear Creek County	\$2, 064, 863
Gilpin County	1, 763, 986
Park County	835, 800
Boulder County	767, 000
Fremont County	342, 000
Summit County	142, 000
Lake County	120, 940
San Juan and elsewhere	263, 228
	6, 299, 817

In this are included, besides gold and silver, the items of copper and lead produced during 1875. Mr. Van Wagenen's currency-estimate for the same items being \$6,151,751, it is seen that the discrepancy in the totals is only \$148,066, a small sum, when the difficulty of collecting this kind of information from private concerns in the absence of compulsory laws enforcing truthful statements is borne in mind. In the subdivision by counties there are in several cases such large differences in the estimates that it seems difficult to account for them, and I can imagine no other cause than inaccurate reports as to the source of shipments from the railroads.

The receipts of the Denver branch mint during the year were as follows:

First quarter, January to April	\$133, 446 66
Second quarter, April to July	162, 566 72
Third quarter, July to October	243, 069 01
Fourth quarter, October to January	218, 098 50
	757, 180 89

The achievements of the year 1875 in Colorado mining include, aside from a large amount of work performed on the old and well-proven mines, the inauguration of a great number of enterprises, and the opening of several entirely new and apparently important districts, which may be now recorded as among the standard ones of the Territory. At the close of 1874, eight smelting and amalgamating works were in operation, and five parties were shipping ore out of the Territory.

The total metal-yield for that year amounted to \$5,362,383. At the present time eleven beneficiating works are in active operation, and eight ore-buyers are shipping the high grades east. There were no concentrating establishments in successful operation during 1874, except the one at Idaho, which ran only for a few weeks. At the close of this year three large works, with a combined capacity of over a hundred tons daily, have been built at Georgetown, and will undoubtedly affect very largely the production of metals during 1876. The Collom Company has been energetically at work during the year on a comprehensive plan, and is just completing its central works at Golden City. This company already has separating and concentrating establishments at Idaho and Black Hawk, and contemplates erecting others at Georgetown and Boulder. The smelting-works at Golden will receive the products from the branch works, and either smelt them into lead rich in gold and silver, or separate the bullion, as may be found most advisable and economical.

The Golden Smelting Company, under Mr. West, the Rosita Reduction-Works, the Mount Lincoln Smelting-Works, and Green & Co.'s Works in Baker's Park have been the year's additions to the smelting-capacity of the Territory. Two new amalgamating-works have been built.

Mr. Stewart, at Georgetown, has supplemented his establishment with the Hunt & Douglas process, and is now treating gold and copper, as well as silver ores. Several attempts have been made at chlorination in Boulder and Park Counties, with no definite success as yet. Several new stamp-mills have been built, and most of the old ones have been working steadily throughout the year. Several entirely new mining-districts have been discovered during the year, viz: The Rabbit-Ear, in Grand County, containing mines of argentiferous galena; the Magnolia, in Boulder County, with ores of gold and silver combined with tellurium; and the Uncompahgre, Gunnison, and Lake districts, in the southwestern part of the Territory, where the ores are mostly those of silver; and the districts back of Fort Collins, in which has been found good nickel-bearing pyrites, besides the ordinary galena and pyritous ores, carrying gold and silver.

Four of the older districts, discovered years ago, and the history of which has been one of alternate growth and retrogression, are now showing signs of renewed vigor, and will probably maintain a steady growth hereafter. These are Empire, (gold,) Gold Hill, (gold,) Jim Creek, (gold and tellurium,) and Daily, (silver.)

Six of the districts discovered during 1873 and 1874 have passed safely through the vicissitudes of early age, and are already producing in considerable amounts and with regularity. The Summit and Eureka, (San Juan,) Rosita, (Fremont County,) Sunshine, (Boulder County,) Geneva, (Clear Creek County,) and Hans Peak, (Grand County.)

The proportion of silver to gold produced shows a regular and rapid increase, which fact may be considered as an advantage to the general condition of the industry, inasmuch as silver-mining presents fewer risks and more favorable chances than gold-mining. About three-fifths of the precious-metal production of the mines is now silver, whereas in 1866 that metal bore the proportion of about one-fifth.

In Georgetown and Central, the oldest two camps in the Territory, the fierce litigations that have for many years retarded the development of the mines, and caused so much distrust to investors, show signs of dying out. Though several of the largest and most valuable mines are still hampered by expensive lawsuits, it is not likely that many new

ones of great magnitude will arise, as pre-emptors are generally exercising more care in regard to their titles, and are compromising with contestants whenever possible. The demand for patents was never so great as at present, evidencing that owners have confidence in the value of their property, and are willing to expend money in what may be considered a species of dead-work.

The placer interests have enlarged greatly during the year, the amount of ground now under improvement being fully one third more than during 1874. The gain has been in the South Park, Bear Valley, South Clear Creek, Arkansas Valley, and at the base of Hans Peak, where gold has been found to exist over much larger areas than had before been supposed. The successful introduction of the most approved California machinery, and the extension of the "booming" system, (described in a former report,) have made available large districts of comparatively good ground, which may now be washed with profit. While the placer-mining interests of Colorado can never be expected to assume the enormous dimensions of those of the Pacific coast, (because the formations are more local,) they are yet good for many millions of gold, and offer inducements for the investment of capital. Observation during the last twelve years has shown that both the rain-fall and snow-fall have increased, and with each year of ordinary weather a larger quantity of water may be expected. It is true that, at the same time, owing to the removal of large bodies of timber from the mountains, the winters' snows disappear more rapidly, and with a greater tendency to freshets; but this difficulty will be obviated gradually by the construction of reservoirs, and the growth of new forests, already springing up around the older settlements, which were deprived of their trees in the early days of mining in the country.

The production of pig-lead for the year has been small. The Lincoln City Works have been idle for the entire year and the Golden Works did not open till September. Quite a large amount of this metal has been turned out from the new works in Baker Park, and if the run had been one of a year, instead of a few months, the total would have been a large addition to the product of the Territory.

The copper out-put remains substantially as it was last year. The only works saving this metal are at Black Hawk and Golden, and as the source of supply is mainly from the pyritous gold-ores of Gilpin, Boulder, and Park Counties, the production will advance very slowly. Of the copper-bearing veins there are plenty in Colorado, and so advantageously located as to offer unusual inducements for the erection of works to smelt the ores, if the mines were opened sufficiently to supply them. Till this is done, and the necessary works are built, however, the Territory cannot be expected to become a great producer of copper.

Of the rarer metals, tellurium, bismuth, and nickel may be mentioned. The belt of mines carrying tellurides of gold and silver, which last year was supposed to be confined to the veins on Gold Hill, has been traced north and south for a total distance of nearly twenty miles, and as rich ore found as was ever taken from the Red Cloud or Cold Spring. Bismuth has been found to a high percentage in the argentiferous galena of the Geneva and Snake River mines, and nickel, besides, occurring, as was known last year, in Gilpin County and in the Home-Stake lode, has lately been found in veins carrying true copper-nickel in the northern part of the Territory.

One of the most important enterprises of the year connected with the

mining-industry was the formation, on June 1, of the Colorado Mining and Exchange Board. At first this institution had to contend with great difficulties, and received but little encouragement; but at the close of the year it had become pretty firmly established. The board now numbers 35 members, and has a list of good mines on which stock-transactions to the amount of nearly \$100,000 had taken place between June 1 and the end of the year. The board has a fine room in Denver, meets daily at 11.45 a. m., and attracts always a large crowd of visitors. It is thought that during 1876 its business will have so augmented that it will affect very considerably the introduction of capital and hasten the development of a great number of the mines.

CONDITION OF THE SMELTING BUSINESS.

For the past five years Colorado has been a battle-ground for smelting companies. Its mining-district, situated on both sides of the great continental divide, which at no point sinks to an altitude less than 10,000 feet above the sea, are not easily accessible from any one central point, nor are they conveniently located with respect to each other. But one mining-town in the State is reached by rail, all the others being from 18 to 300 miles away from steam-communication. Several have between them and the rest of the world the barrier of the Great Divide, a wall which in most places is completely impassable for five months in the year. As a result, the utmost latitude has been allowed for competitors in the ore-market. Invoices of ore, like extra-good commercial paper, have been eagerly sought, and buyers, in their anxiety to get hold of them, have decreased the rate of discount on their value until the margins have been swept away, and the once-eager purchasers have found themselves holders of property costing more than it contained. In other words, so ardently have purchasers from Chicago, Saint Louis, Wyandotte, Pittsburgh, Newark, and Omaha sought for Colorado ores, that the price has been run up to figures which preclude any profit to buyers, and which also prevent any healthy competition at home.

This state of the market affects directly only that part of the production which is included within the limits of high-grade silver-ores, the mineral being worth \$250 and upward per ton in precious metal. But, as in Colorado, about \$1,350,000 of this material is produced annually. It constitutes a considerable item in the total yield of the mines, and the business of handling it indirectly affects all ores of lower grade that are not treated at or close by the mine. In this way the entire system of ore-brokerage—in which a capital of not less than \$700,000 is employed—is sadly demoralized, and has in turn demoralized the whole business of smelting. Reducers cannot now buy directly of the miner, but must deal through middlemen, who are constantly quarreling among themselves on the subjects of rates, weights, and freights.

A glance at the map of Colorado will show how much the question of geography enters into the business of mining. For instance, the mines on the Middle Boulder and Left Hand Creeks have a most natural and convenient outlet for their produce by way of the cañons of these streams. But when the plains are reached, the greater part of the ore is brought around to the mouth of the next cañon, (Clear Creek,) and is transported 25 miles up into the mountains again before reduction. Clear Creek County ores have from 15 to 30 miles between them and the nearest smelting-works. Park County mineral is smelted to matte, and then shipped 120 miles before it is reduced to bullion. Rosita has 190 miles

between it and reduction, while San Juan ores have to cross two snowy ranges, and spend ten days at least on the road before the furnaces are reached.

Nevertheless, in the face of these numerous natural disadvantages, ore still keeps going out of Colorado, and the struggle for the possession of it is as brisk as ever. Saint Louis and Pittsburgh at least do not seem to have been injured by the competition, if one may judge by the fact of their continued purchases, even at the highest rates.

The main advantage possessed by eastern buyers has been their command of a cheap fuel—coke. It is possible that when the Denver and Rio Grande Railroad reaches Trinidad, which will be early in the summer, Colorado smelting-works can, by the use of domestic coke, successfully compete with those in the East. Eastern coke now costs from \$25 to \$30 per ton at the foot of the mountains, while the Trinidad coke, which is believed to be quite as good for the purposes of the smelter as that of Pennsylvania or Indiana, can be laid down in Denver for \$10 to \$12 per ton.

In the smelting business some important changes have occurred. The persistent effort at Golden City to smelt for lead has not proved successful, and the management, finding that the supply of galena was inadequate, has altered the works accordingly, and is now smelting for copper-matte. This establishment has only been in operation during the last three months of the year, but its campaign was so much of a success that operations will now in all probability be continuous, with none of the discouraging stoppages that have formerly done so much toward discrediting the establishment in the eyes of the miner. The following statement, taken from the books of the company, shows the business of the three months ending December 29, 1875:

Total number of tons of ore bought.....	660
Total number of ounces of silver.....	34, 613
Total number of ounces of gold.....	474

Outlay:

Cash paid for stock.....	\$34, 801 05
Labor, fuel, flux, &c.....	16, 241 76
	51, 042 81

Income:

Receipts from bullion-sales.....	\$37, 464 36
Metal on hand, (lead, gold, and silver)*.....	20, 322 17
Metallic lead and copper.....	1, 832 00
	59, 618 53

The amount of lead-ore received was very small, averaging about 7 per cent., or 46½ tons, of which about 25 per cent. was saved.

I may mention here an improvement in the utilization of the lignites of the country lately introduced by Mr. West, the superintendent, which is an important advance in local metallurgy. I refer to his apparatus for using powdered lignite in reverberatory furnaces. Mr. West has

* This item includes an estimate, based on former runs of the same works, of the material in the furnace-hearth.

been experimenting on this subject for a long time, and has his machinery now in operation, having attained, so far as can be judged by outsiders, a perfect success.

The coal is ground to a powder and stowed in a box, in the bottom of which are two outlets. Through these the coal is forced by a right-and-left screw into two upright pipes, through which it falls into the horizontal draught or blast pipes. Here the falling coal is caught by the blast and carried into the furnace, where it ignites immediately on reaching the bridge. When the furnace is first fired up, it is of course necessary to start a fire in the fire-box, but no additional wood is needed afterward, except when, after drawing both slag and matte and recharging, the furnace cools off more than usual.

This device has now been in operation for several weeks without interruption. Although the coal used contains from 20 to 27 per cent. of moisture, and is from one of the second-rate lignite-mines of the Territory, the combustion is far more perfect than can be brought about with lump-coal, and the heat is intense and very even. More striking, however, is the financial success of the machine. It is now running steadily on a 7-ton matte-furnace and saving \$30 per day on previous cost. The idea of burning coal, and especially soft coal, in the shape of a fine powder, is of course not new, nor do I think that Mr. West makes this claim. Messrs. Whelpley & Storer have, in fact, for years had a patent on a very perfect device for this purpose, which has been extensively used throughout the country. It consists of a ventilator, the arms of which, at the same time that they furnish the necessary blast for perfect combustion, crush the coal to an impalpable powder, which is continually fed out into the combustion-chamber by the wind.

I cannot close these observations without pointing out the fact that, although a very perfect combustion is accomplished in this way, the employment of the method for the purpose of matte-smelting, with lignites as a fuel, is objectionable on the ground that the very siliceous ashes are carried into the smelting-chamber, thereby increasing the percentage of silica already in the (mostly very siliceous) ore, and thus either occasioning an augmented addition of flux or a direct loss of heat by the higher temperature necessary to lignify a more siliceous slag, to say nothing of a probably greater loss of the precious metals, both through the stiffer slag and mechanically by the draught.

A more proper way of using the lignites for smelting ores of the precious metals in reverberatories is, no doubt, the employment of gas-generators or devices half-way between the common grate and gas-generators, such as have been employed for some time by Mr. Pearce, of the Boston and Colorado Works, and by various works in Utah, in the latter Territory mainly in roasting-furnaces used for slagging. In this method there is not only a perfect combustion reached, but the ashes are also kept separate from the charge and the temperature can be regulated at will by a simple damper.

The Boyd Works, at Boulder, have produced about \$6,000 during the year. The proprietor has not yet perfected his system, and, moreover, has never succeeded in getting a good supply of galena-ores. He is, however, working a galena-vein in James Creek, and expects to be better supplied next year.

The Denver Works have been idle during the entire year, but are to be opened in the early spring.

The following table gives a list of works in operation during 1875, with their capacity, location, system of reduction, and plant. I include

all works that have run at any time during the year, excepting stamp-mills.

Name.	Location.	System employed.	Plant.	Capacity, tons per day.
Batesville Mill.....	Boulder, (North)	Roasting and amalgamation.	.....	15
Boston and Colorado Smelting-Works.	Black Hawk....	Matte-roasting..	2 calcining-furnaces; 4 matte-furnaces, and complete separation-works.	50
Boston and Colorado Smelting-Works (Alma).	Alma.....	do.....	1 calcining-furnace; 1 matte-furnace.	20
Boyd's Smelting-Works..	Boulder.....	Lead-smelting..	1 patent roaster and 1 stack-furnace	12
Golden Smelting-Works..	Golden.....	do.....	1 calcining-furnace; 1 slag-furnace, and 2 stack-furnaces.	15
Judd & Crosby Works....	Georgetown....	Roasting and amalgamation.	20 stamps; 1 triple Stewart furnace	15
Mount Lincoln Smelting-Works.	Dudley.....	Matte-smelting..	1 calcining and 1 matte-furnace...	15
Nederland Mill.....	Nederland....	Roasting and amalgamation.	20 stamps; 4 Brückner cylinders, and pans.	20
Pelican Silver-Mining Company.	Georgetown....	do.....	15 stamps; 5 cylinders, and 8 barrels.	15
Rosita Reduction-Works	Rosita.....	do.....	Ball pulverizer; 1 roasting-furnace and pans.	10
Stewart Silver-Reducing Company.	Georgetown....	do.....	20 stamps; 2 furnaces and pans...	20
Greene & Co.....	Silverton.....	Lead-smelting..	Roasting and blast furnace.....	10

GILPIN COUNTY.

The production of the Gilpin County mines during the year has been as follows:

	Currency.
Stamp-mill, gold	\$1,240,109 00
Boston and Colorado Smelting-Works	502,000 00
Ore shipped and jewelers' gold	21,876 00
	1,763,985 00
Or, in gold-value	1,520,555 07

The following is the currency and gold value of mill-gold by months:

Months.	Currency.	Coin.
January	\$99,993 33	{ Gold... \$24,901 17 Silver.. 1,901 75 \$26,102 92
February	72,868 30	{ Gold... 61,906 71 Silver.. 942 93 62,851 64
March	87,610 05	{ Gold... 74,431 42 Silver.. 1,132 45 75,563 87
April	90,734 97	{ Gold... 77,066 28 Silver.. 1,172 85 78,250 13
May	85,097 51	{ Gold... 72,625 83 Silver.. 1,101 47 73,727 30
June	110,667 78	{ Gold... 94,022 24 Silver.. 1,428 96 95,451 20
July	107,036 60	{ Gold... 99,935 77 Silver.. 1,383 55 101,319 32
August	119,034 23	{ Gold... 101,128 83 Silver.. 1,538 51 102,667 34

Months.	Currency.	Coin.
September	\$112, 775 35	{ Gold ... \$95, 794 28 Silver.. 1, 457 47
October	109, 563 00	{ Gold ... 101, 594 91 Silver.. 1, 545 72
November	112, 308 90	{ Gold ... 95, 594 99 Silver.. 1, 453 21
December	132, 499 46	{ Gold ... 112, 568 40 Silver.. 1, 712 70
Total	1, 240, 109 08	114, 281 10 1, 087, 664 40

Thirty stamp-mills have been in operation during the year, carrying a total of 56 heads of stamps, all that was available without the introduction of new steam-power. Among the mills that have been running are Potter's, Clayton's, Waterman's, Whitcomb's, Buell's, Briggs's Smith & Parmelee's, Black-Hawk, Empire, Wheeler, and Sullivan.

Among the many mines in active operation during the year the following are the principal ones:

Mammoth.—From 1,000 to 1,500 feet of this vein have been worked during the year, mainly by lessees. It has paid well, and has yielded a steady production of 10 to 15 tons daily, worth \$10 per ton. Toward the close of the year the production increased, and is now nearly double the above figure. Almost all the ore coming out is from levels and stopes within 200 feet of the surface.

Bates & Hunter.—The amount of work done on this property during the year has been small, and consisted mainly in clearing it of water and placing it in shape for further developments. Its western extension, the German, has received more attention. The latter is proving itself to be one of the best mines on Mammoth Hill. It was opened during the summer, and has been worked continuously since then with good results.

The Mountain City has been successfully worked during the entire year by a small force of men. It has yielded ore worth from \$12 to \$15 per ton.

The Tiernay lode has produced a fair quantity of \$8 to \$10 ore.

Work was commenced on the O. K. in July. A new shaft-house has been built, and the shaft sunk to the depth of 165 feet. The ore has averaged, in the mills, about \$10 per ton.

The Winnebago mine was worked a little during last year. The shaft was drained and a small amount of ore taken out. From the cañon of Chase Gulch, on the northern slope of Carlo Hill, is running the Belden Tunnel, which, at the close of the year, had attained a length of 100 feet. It is being pushed ahead rapidly, and will intersect the Winnebago about 600 feet below its outcrop.

The Gunnell ranks among the very best mines of the county. Eight hundred feet have been under lease during the year to Kimber & Fullerton, and several other parties have been working on other parts of the vein. The main shaft had reached at the close of the year a depth of 700 feet, and the production amounted to between 25 and 35 tons daily. The Gunnell ore is of rather low grade. That which is milled averages \$16 per ton, while the smelting ore brings from \$50 to \$75 at the Boston and Colorado Smelting-Works. The mine has been much

troubled during the year with water, but has, nevertheless, been worked with profit.

The Prize and the Sensenderffer, which are probably southwestern extensions of the Gunnell, have been idle during the entire year. Beyond the latter, however, and still on the same vein, is the Hubert, which has been worked during a portion of the year, and with very satisfactory results. Some of the ore extracted has been of very high grade.

The Fiske is one of the old standard mines, and is still under lease to Mr. George W. Matee. It has produced quite steadily during the year about \$5,000 monthly. It is now worked entirely from the surface, instead of from the Bobtail tunnel, as formerly.

The Pleasant View was incorporated in January, 1876, under a stock organization, and the stock was put on the Denver board. It is undoubtedly an extension of the Gunnell, and is a mine of great promise. At the close of the year the shaft was 150 feet deep, and two sets of levels had been started. A good body of ore was exposed along the entire depth of the shaft. No ore, however, has been milled as yet. This mine is one of the old locations of the county; but, though well worth developing, it has lain idle for a number of years.

The Saint Louis lies close to the Pleasant View, and is, probably, on the same vein, or a branch of it. It was re-opened during the summer, after several years of inactivity, and has been sunk upon for over 100 feet. The vein shows good "pay" in considerable quantity. It is taken out as development proceeds, and accumulated on the dump. About 50 tons is the amount thus far extracted. The mine is owned by Wisconsin parties, who are opening it extensively before crushing any ore.

The Leavitt was worked steadily up to the month of June, and produced in that time \$55,000. During the remainder of the year the main portion of the mine was idle, but at the close of the year the entire property was leased to the Briggs Brothers, who are preparing now to work the mine on a more extended scale than ever before. As this mine is one of the most largely developed in Gilpin County, it merits a special description. The vein, which has been traced clearly from Clear Creek to Quartz Hill, a distance of about 3 miles, is opened by mine shafts, the deepest of which is now a little over 500 feet down. For 200 feet on either side of this shaft the vein has been worked very extensively, and has produced nearly \$500,000 in gold. The entire vein is estimated to have yielded since its opening about \$1,000,000, which, considering the desultory manner in which all but that portion around the deep shaft has been worked, and the low grade of the ore, (\$7 to \$11 per ton,) is an unusually large amount.

The total length of the shafts aggregates 2,210 feet, and of levels far more. The amount of ground broken is enormous.

Six hundred and eighty feet west of the main Leavitt shaft the lode is crossed diagonally by the Kip vein, which is included in the Leavitt property, and which has been opened to a depth of 270 feet. The ore in this vein is similar to that of the main fissure, and is found in bodies of large size. The main feature of interest in this property is the arrangement by which the 60-stamp mill and the boilers of the hoisting-engine are supplied with water. Gregory Gulch does not furnish enough water, even in the Spring, to supply so large an establishment, and, moreover, the stream is so charged with the *débris* of mills farther up the gulch as to be totally unfit for use. It was determined after long consideration, by Mr. Buell, the proprietor, to erect a series of settling-tanks, and use the water from the mine over and over

again in the mill until enough was gained for all purposes. The demand for the mill and boilers was from 100,000 to 150,000 gallons each in 24 hours, while the mine furnishes from 25,000 to 50,000 gallons in the same time. The arrangements, now in most successful operation, are as follows:

Tank No. 1, into which the water flows from the pumps, is 25 feet square and 4 feet deep, and is divided into compartments 15 feet long by 3 feet wide.* The water flows from one compartment to another, and in the transit leaves behind the heavier particles of ore and rock brought up from the shaft. From No. 1 the water is carried through a race-way into tank No. 2, which has a capacity of 80,000 gallons. This tank is divided into two compartments, through which the water passes; and out of them by a second race-way into tank No. 3, the capacity of which is 100,000 gallons. From this it passes through a flume 50 feet long into a well underneath the floor of the mill. Here it is quite clear and ready for use in the batteries. Small pumps elevate the desired quantity into circular tanks in front of the stamps, from which it is led to the mortars, to be subsequently returned to the tanks.

The whole distance traveled by the water from the stamps to its return to them again is 400 feet. The tanks are sluiced out frequently, and easily kept clear from waste. In addition to the three tanks above mentioned is a fourth, having a capacity of 250,000 gallons, making the total storage capacity of the system 500,000 gallons. Its advantages are not alone that a small amount of water is made to supply a large demand by using it several times over, but it has been found that even in the coldest days in winter a temperature of 60° to 70° is maintained in the tanks, and thus a comparatively warm water is supplied to the stamps without the use of steam-heating apparatus.

Almost all the work done on the Bobtail Mine during 1875 was below the tunnel-level. The deepest workings are now 700 feet below the surface, or 135 feet below the tunnel. At the depth of 90 feet below the tunnel a continuous level has been driven for more than 1,000 feet, exploring the entire ground owned by the company. About 70 men have been steadily employed during the year, and the production has averaged over 2,000 tons per month. The mill-ore is gradually improving in value, and, owing to the extended developments, many thousand tons are constantly exposed in advance of extraction. At the point where the tunnel cuts the vein, the company is sinking its main shaft, through which hereafter the entire traffic of the mine is to be carried on. A large underground chamber is being excavated, in which heavy hoisting and pumping machinery will be erected. The company has also determined to use machine-drills in the mine, and, after a long examination, has decided upon the Wood drill, and a full set, with a compressor, has been ordered. The Bobtail vein maintains a good width in its lowest workings, at places expanding 15 or 20 feet. The ore as it goes to the mill averages \$9 to \$11 per ton, and is worked at a considerable profit. The smelting-ore does not assay as richly as last year.

The Gregory lode is at present one of the largest producing veins in Colorado. During 1875 operations have been carried on upon five claims, representing a total length of 2,000 feet. These were the New York and Colorado Company, (500 feet,) the Briggs, (200 feet,) the Black-Hawk, (300 feet,) the Consolidated Gregory, (500 feet,) and the Narragansett, (500 feet.) The product of ore has amounted to 19,000 tons of

* I give these figures as reported to me. The impracticability of making exactly such a division is obvious; but the inconsistency in the account is not important.—R. W. R.

mill-rock, of an average value of \$10 per ton, and 485 tons of smelting-ore, which sold for \$41,000, making the total yield of the vein for the year \$231,000.

The three inside claims—the Briggs, Black-Hawk, and Consolidated Gregory—are now consolidated under one management, that of the Briggs Brothers, who have contracted for a three years' lease on the last named. The combined property has, since the consolidation, been producing 1,800 tons a month, worth about \$20,000 to the producer. It will be seen, therefore, that this property alone will, if its present rate of production is continued, yield during 1876 more than the entire vein did during the last year.

The deepest workings on the vein are in the Briggs claim, whose shaft is at present 700 feet deep below the bottom of the gulch. The mouth of this shaft is located at the lowest point of the outcrop of the vein. Its bottom is considerably over 1,200 feet below the outcrop of the Naragansett.

The Narragansett has been worked but slightly during 1875. The main shaft, which was 440 feet in depth at the beginning of the year, is now a little over 500 feet. At the depth of 470 feet a level 115 feet long has been driven west, and one 55 feet east. A stope has been broken above the former, from which a little more than half the production of the mine has come; the remainder has been taken from old stopes nearer the surface.

During the year the main shaft of the New York and Colorado Company has been extended in depth 50 feet. On the large vein 500 feet of levels have been driven and two 60-foot winzes sunk. On the small vein the 350-foot shaft has been straightened and retimbered and 360 feet of levels driven. A large amount of stoping has been done, and the production has more than covered all current expenses, though never pushed beyond legitimate working. The standing of the mine at the opening of the year is such that stockholders may feel that the property is now saved from the wrecked condition in which it was three years ago.

The Quartz Hill mines have furnished during the year about one-third of the stamp-gold product of the county. The Burroughs, Kansas, Gardner, Alps, Illinois, and Kent County have been the prominent producers. A number of minor properties have given a considerable aggregate product. At the base of the hill the Quartz Hill Tunnel Company is still at work, and advancing slowly.

Twenty-nine hundred feet on the Kansas and Burroughs lodes has been operated under one management during the year. To the westward, where the two veins join, nothing has been done, but next year the same company will probably work there. The main shaft, which is on the Ophir claim, is sunk to a depth of 915 feet, and is producing excellent ore in good quantity. This shaft is sinking to gain a depth of 1,000 feet, when an extensive system of drifts will be begun and the property opened through its entire length. This is undoubtedly one of the finest mines in the Territory. It is generally believed that the two veins will not only unite laterally to the westward, but will also join in depth. The latter point of juncture will not probably be reached in the Ophir shaft for several hundred feet.

The Monmouth claim, on the Kansas, which during the year was bought by New Jersey parties for a price not far from \$35,000, has been yielding uninterruptedly ever since, and has paid, according to statements furnished me by trustworthy parties, a profit at times as high as 12 per cent. a month on the investment.

The English-Kansas has been allowed to remain idle during the entire year. Almost all the remainder of this great vein is in successful operation under American supervision.

The Illinois, though not wholly neglected, has not been worked very extensively during the year. The mill-ore produced has been of high grade, averaging \$20 per ton, and the operations of the year have been financially successful on a small scale. Preparations are making to work the vein more thoroughly during the coming season. It is one of the best lodes on the hill, a continuation of the Mammoth, and possessing all the valuable qualities of that ledge.

The Kent County has yielded steadily throughout the year. At one time the vein showed a width of 3 feet of very rich ore.

On the Gardner operations have not been very extensive. The Clark claim has been worked most, and has repaid the lessees moderately.

Of the other mines on this famous hill but little detailed information can be given. The Louis, Register, Roderick Dhu, Boston, Alps, Wood, and Harsh have been worked intermittently by owners or lessees. That they have not yet proved largely productive is said to be due to the lack of sufficient capital to work them on an extensive scale. The mines of Gilpin County cannot be relied upon to yield much more than \$10 a ton, and in order to make this grade of ore profitable, a large amount must be produced, and there must also be cheap means of transportation from the mine to the mill. Lastly, there is a great need of an abundance of water-power, which as yet the county does not possess.

The total production of the Boston and Colorado Smelting Company's works during the year was \$1,947,000 currency, of which amount \$70,000 was in copper, \$527,000 gold, and the remainder, \$1,350,000, silver. The ores furnishing this product were derived from the surrounding districts, in the following proportion :

Gilpin County :

Gold.....	\$357, 000	
Silver.....	94, 000	
Copper.....	51, 000	
		\$502, 000

Clear Creek County :

Gold.....	4, 000	
Silver.....	438, 000	
		442, 000

Park County :

Gold.....	41, 000	
Silver.....	618, 000	
Copper.....	19, 000	
		678, 000

Boulder County :

Gold.....	113, 000	
Silver.....	74, 000	
		187, 000

Fremont County :

Silver.....	126, 000	
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San Juan.....	12, 000	
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Total.....	1, 947, 000	
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The capital of this company was, late in the year, increased to \$1,000,000. One 15-ton furnace has been added, and at the close of the

season the works had a capacity of 50 tons per day. For some time past Mr. Richard Pearce, who is in charge of the works, has been experimenting to find a process by which the gold left in the matte after the silver is extracted may be economically separated from the copper bottoms, which have heretofore been shipped to Boston. It is now claimed that success has been achieved. The process is reported to be an entirely new one, and is kept rigidly secret. Nothing is now shipped from this establishment but fine bullion. Even the cement-copper which is precipitated in the Ziervogel process is to be melted into ingots hereafter before shipment.

The arrangements and appointments of this establishment are in the highest degree creditable to the management. Receiving as it does ores from all parts of the Territory in very large quantity, it requires extensive sampling-floors. The quantity of telluric ores alone treated last year amounted in value to considerably over \$100,000, while about \$130,000 worth of silver-ores from the southern part of Colorado were sent here for treatment. The company has been able to build up a large area of ground along the narrow gulch by a proper disposition of its slags, and has utilized to great advantage the space thus gained. At the close of the year several important changes were in progress, which will be carried out before spring, and which will increase facilities and cheapen the cost of handling the ore. A full description of the works will be found in the metallurgical part of this report.

CLEAR CREEK COUNTY.

The production of the mines of this county for the year has been as follows :

	Currency.
Silver bullion from the Stewart Reduction Works, Judd & Crosby Works, and Pelican Mill	\$617, 200
Ore shipped to Boston and Colorado Smelting-Works	442, 000
Ore shipped to Golden City Smelting-Works	29, 958
Ore shipped out of the Territory	941, 744
Gold produced from South Clear Creek hydraulic mines and from Empire veins	80, 000
Total	2, 110, 902
Coin value	1, 819, 598

Nearly 12,000 tons of ore was produced and sold, making the average grade of Clear Creek mineral about \$175 per ton. Comparing this with results of the previous year, it will be seen that much more ore has been broken, but the increase has been mainly of the lower grades, such as have heretofore been unavailable. This, coupled with the fact that two large concentration-works are now in operation at Georgetown, may be considered as a most favorable indication of the healthy growth of the mining industry.

It may not be amiss in this connection to discuss the peculiar condition of the ore market in Georgetown, which, as much as any one other circumstance, has given unusual prominence to the district, and forced the miners into what now may be considered an unhealthy condition. In addition to the two milling establishments that have sought for all the ore they could get, there have been no less than five parties seeking ore for export, either to works out of the Territory or to works in other districts. The competition consequently has been exceedingly lively,

and, as outside purchasers have had the advantages of much larger capital, the result has been that the home reduction-works have made little if any profit, and, moreover, have been driven in great measure to content themselves with the low grades, that would not bear the cost of transportation. Indeed, it is doubtful if outside purchasers have made any appreciable profit, and the only parties who have cause to congratulate themselves are the miners and middle-men. It may be urged that if these have not suffered, the industry is uninjured; but such an assumption is certainly a mistake. Any business, to be in a healthy and prosperous condition, should yield satisfactory returns to both producer and consumer. If the conditions are otherwise, there will come a time when the latter (or most of them) will decline to conduct business without reasonable profits, and the market will fall into the hands of one or two parties whose capital has allowed them to outlast the rest, and who, when their turn arrives, will put down prices to a figure that will not only permit a present profit, but will rapidly make up for all previous losses.

This condition of affairs is, perhaps, not far distant in Georgetown. For some time past Mr. Stewart has seen the impossibility of an amalgamation-works competing for ore in a base-metal district where as high as \$1 for each per cent. of lead over 15 has been offered by outside buyers; and he has, therefore, endeavored to protect himself by remodeling his system of reduction so that it would include the separation of copper and a more perfect extraction of the silver. Unfortunately, his works were destroyed by fire on December 19, and all endeavors in that line must, for some time at least, be delayed.

The mines around Georgetown have now been opened to such an extent that the average quality of their production may fairly be gauged. It is evident that not over ten tons daily of ore really suitable for roasting and amalgamation can be produced without having recourse to dump-rock, which had better go for concentration-works. Even this supply, if it be of good grade, (150 to 250 ounces,) will be sought by exporters. Our amalgamation-works is, in fact, all that the present business of the camp can supply, and more will only serve to increase the complications already existing.

The market has further suffered from the wide-spread opinion that a large proportion of the ores were suitable for lead-smelting. While it is true that on an average about 10 per cent. of that metal can be obtained, and from many of the mines even a higher percentage, it must not be overlooked that with the galena occurs so large a quantity of zinc-blende that its value as a smelting-ore, unless separated, is greatly impaired. In spite, however, of this fact, which has been amply demonstrated, there is still a vigorous demand from Pittsburgh, Wyandotte, Chicago, Saint Louis, and Newark for Georgetown ores. This demand, caused at first by a desire to get galena, is now continued from a wish to secure high-grade silver-ore, (which undoubtedly the mines can yield,) and Georgetown, being the only camp of any size on the eastern slope of the range producing such ore, has been the theater of the most active competition. Buyers have been willing to pay nearly the full value of the silver and lead, in order to obtain the ore for mixing purposes.

Mr. Van Wagenen considers this an unfortunate condition of affairs, because it discourages home smelting-works; because it creates fictitious values for the product of the mines, which cannot be expected to last; and because, as soon as any other locality is opened, where true lead-smelting ores can be produced, buyers will have no more need of

those from Georgetown and the market will be left in the hands of a few, who can make their own prices.

I am not sure, however, that the demand for the Georgetown ores "for mixed purposes" is unhealthy, or would cease upon the discovery of other districts supplying purer galena.

The following is a list of the important mines that have been worked during the year:

Stevens, Baker, East Roe, Brown, Glasgow, East Terrible, Parr, Silver Plume, Queen of the West, New Boston, Comet, Colorado Central, Ocean Wave, St. Joe, Hercules and Seven-Thirty, Coldspring, Dives, Pelican, Payrock, Dunkirk, Fred Rogers, Polar Star, Silver Cloud, Magnet, East Griffith, Equator, Star, Pulaski, Victor, President, Silver Ore.

In addition to these, a very large number of claims have been more or less under development. The system of leasing is much in favor, and fully one-third of the production is from mines worked in that manner. At the same time, the larger mines are, as a rule, operated on a more comprehensive and better system than heretofore, and as a result their condition has improved. The old tunnel excitement (in regard to which I have expressed my opinion in former reports) has been succeeded by a fashion of deep mining, which has already proved itself a step in the right direction.

The new discoveries of the year have been mainly on Democrat Mountain, where a belt of very strong lodes, carrying rich surface-ores, has been found. The Polar Star and Fred Rogers, which are older locations on this mountain, have been developed considerably, and have yielded good results from both their surface and their deep workings. The newly-discovered mines are apparently of the same class.

The Empire mines, though not producing largely, have not been left idle. Mr. Stewart has been most active in encouraging their development; and had it not been for the destruction of his mill, a large amount of mineral would have been taken out during 1876. As it is, there is little or no market for the ores, which are mainly iron-pyrites, and not very rich in gold. A Bolthoff mill was erected there during the summer.

The production of gulch-gold on and below Spanish Bar has amounted, as nearly as can be ascertained, to \$80,000, showing an increase of over \$30,000 as compared with last year. Ten claims have been worked intermittently during the season, two of which have done remarkably well.

At and near Idaho the Hukill, Victor, Veto, Queen, Seaton, and a number of other mines have been more or less worked. The yield of the mines of this section of the county has amounted to about \$90,000, most of which has been produced at the Boston and Colorado Smelting-Works, which bought the ores.

Mines.—The legal horizon has undergone a little clearing this year, though none of the heavy suits have been definitely settled. The Dives and Pelican fight grew in bitterness and vigor from January, culminating in May in the assassination of one of the principal owners of the latter claim, since which time both parties to the litigation have been earnestly looking for a settlement. The year closed without this most desirable event, but it seems likely that an understanding will be reached within another twelve months. Since the examination of the property by Mr. Clarence King, the attention of San Francisco capitalists has been drawn to it, and at one time the vein was nearly disposed of to a company formed in that city. Of the other large suits none have yet come to a definite conclusion, though all are tending in that direction.

In *West Argentine district* the Stevens and Brooklyn have been continuously worked, with results that have been considered fairly satisfactory, considering the altitude and location of the veins. The Stevens having been purchased by a wealthy company, will doubtless be developed in time to a very valuable property. A tunnel is being driven from the base of the mountain to strike the vein about 350 feet below the outcrop, and at a distance from the tunnel-mouth (so steep is the precipice of the mountain) of not over 400 feet. It will hardly be completed till late in the summer. The main working shaft is being sunk to connect with it, so that in future all operations may be carried on from the base of the mountain. This will lessen the cost of production by fully one-third. The ore produced during the year has yielded in the mill about 120 ounces in silver per ton and 70 per cent. in lead. The vein has proved to be remarkably even and regular in nearly all parts opened, and should the tunnel cut as good a lode below as is opened above, the production can be greatly increased.

The Brooklyn has been worked under lease during a large part of the year, but has not produced any considerable amount of ore. What has come out, however, has been of unusually high grade.

In *Brown Gulch* more development has been effected during the past year than during any previous season. The properties worked have been old discoveries.

Early in the year the east level from the Silver-Ore lode broke into the fourth level of the Terrible mine. Immediately an injunction was issued against the latter, which, after a little preliminary fighting, resulted in the closing of the Terrible mine and an order from the court prohibiting either party from extracting ore from the ground in dispute below the tunnel-level. For several months parties of tributaries were at work in the upper and partially-exhausted levels of this famous lode, and the concentration-works were kept running. At the close of the year, however, the entire property was idle, and seems likely to remain so until a compromise can be effected between the English company and Mr. Hammill, of the Silver Ore.

As this property has proved to be one of great value, and has been developed more extensively and in a better manner than any other in the district, its stoppage affected the general business of the town considerably, and has been in every way a misfortune. The great ore-body which gave the mine its reputation was, at the time of stoppage, as finely developed in the seventh (lowest) level as above, and bid fair to extend for a long distance farther. The dip of the chimney was, however, to the west, and for the last 100 feet no ore of any account had been found in the shaft. This circumstance showed that ultimately the body would pass into the Silver-Ore claim, which, during the last months of this year, proved to be the case; and as the eastern part of the mine has so far yielded but little, it is evident that much expensive development must be done before the English Terrible alone can gain the position it held before its stoppage. It has been hoped that this consideration would have had some weight in inducing the English stockholders to buy out the Silver Ore claim.

The Clark Terrible has been worked with considerable steadiness during the year, (mostly by lessees,) and has maintained a moderate production.

The Mammoth and Glasgow have been in the hands of lessees all the year. Meanwhile an Erie (Pa.) company has been running a tunnel to cut these veins, which has already attained a length of about 300 feet.

When finished it will strike the Mammoth at the depth of about 200 feet.

The Atlantic has yielded a small quantity of very rich ore. It has been worked steadily, and is deemed likely to develop into a valuable mine.

The Hercules Company leased its mine for the most of the year, and the production has been small, though not because of any exhaustion of the vein. The Seven-Thirty, which is on the same lode, has been in a similar condition. In the fall, however, the Earl Roe vein, which by some is considered a continuation of the Seven-Thirty and by others a mere spur from the Hercules, was made the basis of a stock company, which was floated on the Denver exchange. Subsequently the three properties were consolidated, and at the same time passed into the hands of new owners. With the opening of the year it is hoped that operations will be resumed on a large scale, and, judging by the past yield of the claims, a considerable production may be anticipated. For this year the three have not produced over \$30,000.

The Bismarck, President, Brown, Coin, Old Missouri, and a few others have been worked mainly under lease and on a small scale, yet their aggregate product forms a considerable item in the total for the district.

Passing eastward from Brown Gulch, a number of claims are encountered, including the Cashier, Cascade, Bush, Mendota, Virgin, Silver Spring, Captain Wells, and Anglo-Norman, each of which has produced a small amount of silver under intermittent working.

The dispute over the Phoenix and Coldstream mines has this year been confined to the courts, and still remains unsettled. Developments on the former have consisted mainly in sinking and drifting from the discovery-shaft and in driving eastward to connect with corresponding workings on the Coldstream. A few bunches of good ore have been found, but most of the vein-matter was of low grade and unprofitable, carrying much iron-pyrites. The main shaft on the Coldstream has been sunk about 100 feet farther, and, besides opening the mine very thoroughly westward, so as to show its course, drifts have been run eastward under Cherokee Flat for nearly 300 feet. There the vein was found strong and fairly good, in places very rich. The production has not, however, been large, since the main object of the owner has been such a development as would give hope of settling the litigation which has been pending so long.

The Pelican and Dives mines are perhaps the most important in the county. It has been impossible to arrive at their exact production, but the amount cannot have been less than half a million dollars, and was probably nearer \$700,000. During a large part of the year the richest parts of the mines have been enjoined from both claimants, and this is the present condition of the property. The lawsuit which has been pending for three years concerning this magnificent vein is not yet ended, though both parties seem quite ready to agree to a compromise. Meanwhile the development of the vein has not been neglected. In the Pelican explorations have been pushed westward beyond the No. 2½ tunnel, and into a part of the mine hitherto comparatively barren. In the fall a new chimney of ore was met with, which is now being followed both up and down, with very gratifying results. Up to the close of the year much work had been done in this part of the mine, and the ore-body discovered promises to be fully as large as, if not larger than, any yet opened. Contrary to the general pitch of the chimneys in the Pelican-Dives vein, this one inclines to the west. It has been explored horizontally along the lode for about 75 feet, which is probably nearly

its limit, and on the dip of the fissure for about a hundred. The ore is the same as that usually found in this mine, carrying perhaps a trifle more zincblende, and averaging about \$110 to the ton, as nearly as I can ascertain. In places it is 6 to 8 feet in width, nearly solid, and averages fully 18 inches for nearly the whole length as so far exposed.

More work has been done on the Dives property than on the Pelican, mainly because the mine has been in leasers' hands. The deepest workings are now about 500 feet below the outcroppings. Ore has been found in abundance, some of it of excellent quality. The immense galena-chimney has been followed downward about 100 feet farther than at the date of my last report, and the pay-seam has been found to maintain its strength with remarkable evenness. So far, this large body of mineral has not been made available, as it carries not more than 40 ounces of silver to the ton, but it is expected that it will be possible to mine this ore with profit as soon as the Silver Plume Concentration Works go into operation. The ore taken out from the several workings on the Dives this year has averaged about the same as that from the Pelican, 110 ounces. During the year a tunnel has been driven from a point on the hill-side about 500 feet down the mountain, which cuts the vein about 250 feet below the surface, and through which all operations are now carried on. The mine is now fitted out with two good hoisting engines and pumps, and operations are carried on consequently at a greatly reduced cost.

Every additional year of development on this lode strengthens the opinion that it is one of unusual value. In time it is to be hoped that the questions of spurs, side-veins, cross-veins, and horses, which are now of the first importance in deciding points of ownership, will be sunk and forgotten in a united development of its lower portions.

Since the above was written, on the basis of Mr. Van Wagenen's report, I have received (October, 1876) from Messrs. Charles A. Martine and Benjamin F. Napheys, of Georgetown, the following letter, which gives the latest description in my possession of this extremely valuable property:

We have jointly examined the lower workings of the Pelican and Dives mines, our purpose being to arrive at a conclusion concerning the supply of ore from both in the immediate future. Our examination of the Pelican Mine was confined to the ground lying below what has been termed the "court level," said level being 90 feet above the main or No. 2½ level, which is connected with the No. 2½ tunnel, and through which the mine is now entirely worked. We also examined the main shaft now being sunk from this No. 2½ level, and the several winzes to the west from said main shaft.

Concerning the several blocks of ground opened up by the court level, and the winzes sunk through to the No. 2½ level, 90 feet below, extending over a length of about 575 feet, we would state that about one-third of it has been worked out. An exceedingly fine body of ore, attaining locally a width of upward of two feet, is now being stoped out to the westward of the "little shaft," (125 feet west of the old whim shaft.) The quality of this ore is fully equal to any heretofore extracted from the mine; 20 tons of the first class, sold last week, averaging above 400 ounces per ton, while the second class (being the ore treated at the Pelican Mill, in Georgetown) contains from 100 to 130 ounces per ton. There is every indication that this body of ore will continue to the west, and that its grade will remain the same.

The ground below the No. 2½ level has been explored by the "main shaft," sunk to a depth of 160 feet below said No. 2½ level, and two winzes, 150 and 450 feet, respectively, west of the main shaft. The main shaft and the two winzes are now being connected by levels. Large amounts of ore are in sight in all the openings, but our attention was specially attracted by a body of unusual width in the drift connecting the main shaft with No. 1 winze, at a depth of 60 feet below the No. 2½ level. Galena predominated largely in this pocket, and a test-run made upon about three tons showed it to contain 51 ounces of silver and 41 per cent. of lead per ton. It is but fair to suppose that large quantities of similar ore will be furnished by this particular portion of the mine.

The sinking of the main shaft has been temporarily suspended, but is soon to be

resumed on the approach of colder weather. Besides, it is to be expected that the farther extension of the Diamond tunnel, now being actively driven, will, at an early day, remove all further difficulties in the way of drainage.

From the above brief statements, it will be seen that those portions of the Pelican Mine which are now being worked are all in a promising condition, and that a steady supply of ore is insured for the future beyond all doubt, while the quality of the same remains about the same as heretofore.

The Dives Mine is now being explored by means of two shafts, the mouths of which are reached through a tunnel, opening in what is called the "engine level," which is about forty feet below the court level in the Pelican Mine. These two shafts are called the Purdue shaft, being near the point of intersection of the tunnel and engine level, and the East Dives shaft, about 95 feet to the eastward of the former. Depths of respectively 375 feet and 265 feet have been reached by them, and both have been sunk upon what is called the intermediate ore-vein.

The hoisting through both shafts is done by engines, steam being supplied to both by one boiler. Both shafts may be considered as good specimens of mining work.

A fine streak of ore, varying in thickness from 15 to 18 inches, was observed on the north vein, immediately west of the Purdue Shaft, which appears to be of good quality, the streak extending over a distance of about 60 feet, and reaching up to the court level.

We descended through the Purdue Shaft to the 270-foot level, about three-fourths of the ground being worked out. A cross-cut, 39 feet in length, run to cut the north vein, and connected with a drift 80 feet in length, showed all along a seam of ore 6 to 12 inches wide.

The 340-foot level was next visited, the ground between this and the level next above being almost intact. The same is true of a streak of ore shown up by a cross-cut run north, and a level connected therewith, the ore-vein being from 4 to 6 inches wide.

An exceedingly fine pocket of ore is in sight in the 400-foot level. This bench was fully 15 inches in width, and extended 165 feet east of the Dives shaft. A test-run made upon 10 tons of this ore showed it to contain upward of 200 ounces per ton. The presence of this bunch of ore at so great a depth—almost the greatest so far reached in this mine—is an extremely encouraging sign for the future prosperity of the mines in question. The ore plainly shows the peculiar fahlore, the presence of which, in greater or smaller quantities, determines the richness of the ores in this district, the pure galena or zinc-blende being comparatively barren.

Our examination of both mines was necessarily a hurried and superficial one, but it is quite safe to assert that there is as much and as good ore in sight at present as during any past period of its history, leaving out of consideration the finding of a few large and rich pockets. The further development of the mine could doubtless be carried on in a more expeditious and economical manner if both properties were to come under one management.

Judging from the general appearance of the lower workings in both mines, we could not help coming to the conclusion that its future, as regards economical results, was thoroughly secured.

The Diamond tunnel is an enterprise begun about three years ago for the purpose of prospecting the mountain a little to the east of the line of Cherokee Gulch. The work has been pushed steadily and rapidly, and at present the face of the tunnel is, according to calculations, not over 200 feet from the Dives-Pelican vein. It is expected that the lode will be cut during the coming summer, and as this will take place at a depth of 600 feet, or 100 feet below the deepest present workings, it will open a new era of mining on this part of Republican Mountain. The Diamond Tunnel Company is a Baltimore organization, entirely distinct from either the Pelican or the Dives Company; yet as the company is said to own no property on the line of its tunnel, its only object can be that of draining the developed mines on that line and of offering a thoroughfare for ores. I am told that arrangements to this effect have been concluded with the Baltimore Company by the several parties interested in the Pelican and Dives, and that as soon as the connection is made the upper surface works will be abandoned and all operations will be carried on from below.

The Hermann Silver-Mining Company is one of the new organizations of the year. It was formed on the Dunkirk property, which by many is thought to be the eastern extension of the Dives. This point

will, doubtless, be settled before long, as the company is rapidly driving its levels west, and if a connection is made it will probably be done early in 1876.

The Silver Plume, a mine owned by an English company, which has experienced all the vicissitudes that generally fall to the lot of those properties, was idle for the first six months of the year. During the last six months, however, it has been worked by lessees, and has yielded about \$25,000. The legal difficulties which have for a long time blocked extensive operations are now somewhat removed, and it is likely that the mine will be worked in the future with more vigor and regularity. The vein belongs to the cross-lobes of Republican Mountain, and has seldom failed to be profitable.

The Payrock, Hopewell, Snowdrift, Tropic, Fingal, Morse, Baxter, and Denver are the other prominent properties of this locality. They have been worked mainly under lease, and with such results as might be expected from a system which throws the mines into the hands of poor men, who are forced to work them for a small but immediate production.

Still farther eastward on the same mountain is the group of veins lying across the line of the Lebanon tunnel. Among these are the South American, Hise, Alhambra, Caledonian, and others. On almost all a little work has been done, but the results have hardly paid the total expense. The Lebanon tunnel has not been driven any farther than as stated in my last report.

Passing around the point on this mountain, and across the ravine separating it from Democrat Mountain, the Beecher and Boston groups of mines are encountered. None of these has been worked during the year, except the Boston. This mine was sold in the spring to a New York company, which immediately began the erection of a concentration-mill at the foot of the mountain. A surface tram-way was built from the mine to the mill, and a number of men were set at work in the mine. The Boston is a very large vein, carrying a low-grade galena, only susceptible of being worked profitably by concentration. The mill was not ready to start until November, and then failed to work satisfactorily. In December a re-organization of the company was effected, and the entire work is now in the hands of Mr. W. W. Rose, who expects to remodel the mill completely.

The *Democrat Mountain* (west side) belt of veins has attracted this year more attention than almost any other in the district. Early in the year the Polar Star was sold, and re-opened under good auspices. The Rogers and Queen of the West experienced the same quickening process, and, to the credit of the mines be it said, the buyers were thoroughly satisfied with their bargains. The production from the camp has been very good, probably amounting to \$200,000 during the year, which, considering the nature of the operations carried on, is a fair result. Next year it is hoped that this figure will be doubled. Numerous other lodes of promise have been found, among which may be mentioned the Silver Cloud and Silver Wing. The Fletcher, Hesperus, and Junction have all been worked at intervals. A good road has been built down the western slope, connecting with the county road across the Empire Pass.

On *Griffith Mountain* work has been confined to the Anglo-Saxon, Court, Magnet, Griffith Extension, Homestead, and a few other minor veins. The ore produced has been very small in amount.

On *Leavenworth Mountain* none of the numerous and rich veins have been worked systematically, with the exception of the Colorado Central.

Yet the production has been very good. The Saco, Equator, Gates, O. K., Compass and Square, Alabama, Ni-wot, Welsh, Phalen, Sweepstakes, Argentine, Simpson, and Ocean Wave, have yielded each a moderate quantity of good ore, but operations have been carried on so irregularly that no detailed report of individual progress and production is possible. Each year of work on this mountain adds hundreds of feet to the levels and drifts with which it is honeycombed, but, unfortunately, only a small portion of this labor is expended in deep development. Most of it is consumed in open cuts and surface excavations, so that today but little more is known of the vein-formations than ten years ago.

The Marshall tunnel made no advance in its main line during the year. The following sketch of the property owned by the Marshall Silver-Mining Company was furnished me by General Marshall, the indefatigable proprietor and manager: The majority of the stockholders are citizens of Colorado, residing in the vicinity. The tunnel has reached a length of 1,300 feet, and has crossed ten veins, of which those not already located have been designated by numbers and regularly located. The aggregate length of the lode-claims patented or surveyed and approved for patent to this company is about 11,000 feet. The underground workings comprise, beside the main tunnel, drifts or side-tunnels and shafts on the lodes, intersected as follows: Marshall tunnel, 1,300; No. 2 tunnel, 350; No. 3 tunnel, 200; No. 4 tunnel, 400; McCoy shaft and tunnel, 550; Tobin shaft, 80; shafts, levels, &c., on Compass and Square and Reynolds lodes, 900; Robinson tunnel-level on No. 5 vein, 500; other levels on the same vein, 660; shafts, levels, and cross-cuts on O. K. lode, 250; shafts, levels, and cross-cuts at other places not included in the foregoing, 1,500; total length of underground workings, 6,690 feet. The cost of the dead-work to about the middle of 1876 is given by General Marshall at \$165,000; cost of mining ore from the different veins, \$65,000; cash yield of the mines to the same date, \$155,000. The company intends to drive the tunnel through the whole of Leavenworth Mountain, a total distance of 2,600 feet, and it is expected that on the southeast slope a network of rich veins, carrying silver in combination with gold, will be encountered. It is reported that a Colorado company has obtained a lease from the Marshall company, on one of the veins cut by the tunnel, and purposes to sink to 1,000 feet below the tunnel-level, or 1,400 below the surface at that point. The royalty is to be 25 per cent. of the gross proceeds of the ore mined.

The Ocean Wave tunnel has advanced sluggishly, finding but little mineral in its course, though it runs directly on a vein.

The Simpson Company has done some good work in developing its mine, though as yet it has been unproductive.

The Colorado Central has not been developed much, if any, deeper than at the close of 1874. Connection has been made with the tunnel, and explorations have been carried east and west for some distance on the 200-foot level. No new pocket like the Bonanza, struck directly on the surface, has been found, though ore of good grade and in fair quantity has not been lacking. Mr. Van Wagenen was unable to ascertain the production of the mine from any authority, but estimates that it could not have been over \$100,000, a figure which is ridiculously small, compared with what it would be if the vein were developed on an adequate scale.

The project of sinking a 500-foot shaft from the tunnel (Marshall) level was broached this year during the general "deep-mining excitement" consequent on the Comstock discoveries in Nevada. A stock company was formed, composed mainly of Georgetown men, and enough

cash has been raised by assessments to begin work. A large chamber has been cut on one side of the tunnel, in which the engine is to be put, and sinking has already begun. The vein in the tunnel is over 25 feet wide and quite soft. This is probably the enterprise alluded to above, under the head of the Marshall tunnel.

BOULDER COUNTY.

The product of the mines of this county, which includes Grand Island, Gold Hill, Sunshine, Magnolia, and Ward districts, has been as follows:

Product of Canton Mine.....	\$210,000
Shipments to Black Hawk.....	187,000
Shipments to Golden City.....	5,000
Shipments out of the Territory...	100,000
Bullion and silver in lead from Batesville and Boyd's Mills...	16,000
Placer-gold.....	40,000
Total.....	558,000
Coin value.....	480,996

These figures show a gain over last year which is perhaps not quite normal, inasmuch as about one-quarter of the product has been from extraordinarily rich surface-pockets, discovered on the "tellurium belt." When my report for 1874 was in course of preparation, Sunshine district was just coming into prominence. The American Mine in that camp had just been sold and placed in charge of Mr. J. Alden Smith. Several other sales had been made, some sacks full of extraordinarily rich ore produced, and a great deal of enthusiasm aroused over new and wonderful discoveries. There appeared, however, such a disproportion between the assays and the mill-returns of these tellurides that many persons doubted the extended distribution and persistency of the ores.

The developments of the year on this class of veins have, however, been surprisingly favorable. The actual amount of telluride ore produced has, as nearly as I can find out, been worth not less than \$220,000, while the work done in sinking, drifting, and opening has been immense. Early in the year prospectors set out in every direction from the central camp, (Sunshine,) and since then there has been a steady succession of important new discoveries. At first these were in the vicinity of Four-Mile Creek, at Salina, Camp Tellurium, and along Gold Run. Then came reports from a new camp on the South Boulder Creek, now called *Magnolia district*, after which the Slide lode, on Gold Hill, was found. Lastly the prospectors found ores of the same character in the valley of Jim Creek, a tributary of Left Hand. It now appears, therefore, that this belt of veins extends north and south for nearly 20 miles, being represented at about every mile of its course by discoveries already made. The belt is about 4 miles in width, runs parallel, or nearly so, with the line of the foot-hills, and maintains a distance of from 6 to 10 miles from the plains. Its southern termination, so far as now known, is in Magnolia and its northern in Providence. It therefore crosses the cañons of the South and Middle Boulder and of Left Hand. Within these limits, since the discovery of the Red Cloud in May, 1873, more than 500 locations have been made of veins carrying telluride ores of gold and silver. Of course most of these are as yet mere prospect-holes, and can boast of but little rich ore; yet in all the characteristic tellurium minerals have been found, either in pockets or disseminated through the

rein-material, and, unless my informants are greatly in error, the majority promise to become, with development, valuable and productive. These mines are in granite and gneiss, presenting all the features supposed to indicate fissure-veins, and in all respects (excepting the nature of their contents) are like other Colorado veins. They are not, as has been often stated, "knife-blade lodes," but range from 4 to 40 feet width, with well-defined walls, and often extensive slickensides. The ore is generally scattered through the entire width of the fissure in quartz or altered granite, and, being of a grayish color and finely disseminated, is easily overlooked. Occasionally it is found concentrated in seams, streaks, or bunches, and in that case almost invariably yields extraordinary mill returns, causing much excitement among the miners. The most exaggerated case of this kind that has taken place during the year was in the Melvina, where a lot of 1,500 pounds, sold at Black Hawk, brought the enormous sum of \$8,300.

Generally, however, the ore is of low grade—from 20 to 50 ounces—and it is this that makes the tellurium district at once so attractive and so disappointing. The miners, who have no possible means of handling their low-grade material, work constantly in the hope of discovering one of these miniature bonanzas. A great number of these have been found and are constantly being uncovered, so that there is always a sufficiency of fuel to feed the flame of excitement in the breast of the sanguine miner.

The amount of low-grade ore that has been taken out is enormous. It constitutes the dump-piles which are rapidly accumulating, and will, in time, produce more metal than the mines have ever turned out. When it is stated that but little rock worth less than \$100 per ton can be handled to any profit, it is evident how vast an amount of material is annually thrown to waste. Owing to the wide dissemination of the telluride minerals in these veins, the crevice material will mill from \$15 to \$30 per ton from wall to wall, and as they are of good width, they are capable of producing immense quantities. There is here a splendid chance for the right kind of concentration-works or for a cheap humid-process.

The prominent mines of the telluride belt are the Coldspring, Red-Cloud, Stirling, Osceola, Grand View, John J., Ellen, American, Keystone, Magnolia, Slide, Melvina, Cash, Phil Sheridan, and Victoria. Of the innumerable other discoveries on the belt, the following are worthy of mention as promising, with development, to become properties of value: In Sunshine district, the Charcoal, Surprise, Silver Dale, and Sunshine; in Magnolia, the Little Dorrit, Mountain Lion, Congress, Raven, and American Eagle; in Spring Dale, the J. A. Smith, Gladiator, Providence, and Van Dam; and in Salina, the Loveland, Great Eastern, Phoenix, First National, Henderson, Ringgold, and Bessie Turner. On these mines are shafts ranging from 15 to 100 feet deep. From nearly every one small lots of ore have been taken, that have milled from \$500 to \$5,000 per ton; the veins are strong, well-defined, and, in many cases, of great width, and while they can hardly be dominated mines, yet they are most excellent prospects, and offer good security for the investment of reasonable sums, so soon as there is provided a means of handling the low grades now thrown on the dumps.

Not one of the older discoveries on Gold Hill is now worked. The Horsfall, which is said to be one of the finest lodes ever found in Colorado, is still idle, though frequent reports are heard of the intention of its owners to reopen it. The Alamakee, Hoosier, Jefferson, Pride of the West, Great Cross, and Forest are in the same condition; and, in

fact, so eager has been the search for the new ore that older claims of known worth seem to have been forgotten.

In *Ward district* three mines are now worked, the Ni-wot, Columbia, and Stoughton. A few other claims of minor importance are under development. Some interesting experiments were made late in the year on Stoughton ore with the new Pomeroy percussion-tables, (a description of which will be found further on,) and it seems likely that during 1876 considerable ore will be treated in this apparatus. Farther back on Gold Hill, in what is known as Williamsburgh, the Washington Avenue Mine, one of the oldest discoveries in the county, has been worked during the year with satisfactory results. A description of its condition will be found elsewhere.

At Sunnyside the Milwaukee, a lode of good reputation, has been idle during the year, but is to be re-opened early in 1876.

The Caribou silver belt has been the scene of a great deal of work during the year. The gross production of the mines has amounted to about \$450,000, being an increase of more than \$100,000 on the figures of 1874. While but a few new veins have been discovered, most of the old locations have been worked with satisfactory results, several sales made by which new capital has been brought in, and those of the mines now sunk to a depth of 200 feet and over have indicated that the veins are to be depended upon, and will return a large profit on judicious working.

The Caribou has labored during the year under the disadvantages of dissensions in a dissatisfied body of stockholders. A struggle has been waged, apparently to determine whether the Dutch or the American party shall rule. So far the former has held the reins. The other side made at the close of the year a vigorous move for the command, but did not achieve success. It is understood in mining circles in Colorado that a strong pool has been formed upon the basis of the stock held by Americans, and that every effort will be made to displace the Dutch management. The mine is undoubtedly one of the best in the Territory, and carries the enormous weight of its \$3,000,000 capital better than was anticipated. It has not, however, yielded any dividends.

The following are detailed descriptions of the condition of some of the mines and mills of the county at the close of the year:

Grand Island District.—No mention was made of the Fourth of July lode in my last report, because, though it had been discovered for some time, no development had been made, and no excitement had arisen in consequence. During this year, however, a number of parties have been at work in various places along its outcrop, and have demonstrated that it is a lode of unusual magnitude and value.

The vein lies about two miles west of the town of Caribou, and cuts directly through the main range of the Rocky Mountains, running down on their western slope into Grand County. Its outcroppings have been traced for nearly six miles without being lost, and the vein, by measurement, is from 300 to 500 feet in width. The crevice material is the same as that found elsewhere, carrying, irregularly scattered across its width, numerous seams of ore, varying in width from an inch to a foot, and of all grades. In many places the ore crops out directly on the surface, showing all the minerals peculiar to the Caribou belt, including argenterous galena, native silver, pyrites, native copper, sulphurets of silver, ruby silver, gray copper, and others.

The vein is divided into a number of claims, eight of which, representing 12,000 feet, have consolidated under one ownership, and will probably during next year be developed to an extent worthy of the

magnitude of the property. A lode with such an enormous outcrop, and showing so well in ore directly on the surface, will most certainly develop greater bodies of mineral when depth is gained. It is proposed by the owners of this 12,000 feet to form a company for the purpose of sinking a vertical shaft to the depth of 1,000 feet directly in the lode. The width of the vein will necessitate exploring cross-cuts at regular distances, and probably before the first 500 feet are passed enough ore will have been found (if one may judge by surface indications) to demonstrate that the Fourth of July is one of the most valuable mines on the continent.

Considerable work has been done on other parts of this vein during the past year, but as the workers have been poor miners, and no united attempt has been made in any one part, the results have been simply a half-dozen shallow shafts, where the expenses of hoisting and draining have been so great as to preclude any possibility of profit, though the ore taken out has averaged well.

At the close of the year the shaft of the Caribou Mine was a little over 500 feet deep. The appearance of the mine was as good as ever before, there being plenty of ore in sight of good grade, (\$30 to \$60,) but the quarrels between the American and Dutch stockholders have prevented harmonious working, and the future of the property is gloomy in the extreme. The production of the year amounted to \$204,000.

On the Sherman and No Name Mines work has been carried on throughout the year, but the production has been comparatively small. The mines, although under separate management, are owned by the same men. The workings in each have reached a depth of over 250 feet, and show good veins of ore. The product is now shipped partly to Black Hawk and partly to Batesville, at which place the new mill of the company is located. This mill has been remodeled several times during the year, and is not yet satisfactorily at work, though several shipments of bullion have been made. The process used is roasting and amalgamation, to which is added occasionally a trial of leaching. Inasmuch as the works can not yet be said to be complete, any detailed description of the machinery used is at present uncalled-for. The shipments of ore from the district outside of the Caribou Mine have been very small. Besides the Sherman and No Name, the Poorman, Grand View, Native Silver, (an extension of the Caribou,) Seven-Thirty, Idaho, Potosi, Sovereign People, and a few others of minor note, have been worked. About three miles east of the town of Caribou, in the valley of the North Boulder, is the Blue Bird, now called the Santa La Saria, a property of which high expectations have been entertained. It has been worked intermittently during the year in the way of development. Some ore has been shipped that milled over \$200 per ton. The company owning it has much faith in the property, and proposes to build a mill as soon as enough ore is in sight to warrant the venture.

Prospectors have been exploring the country around the head of the Middle Boulder this year, and a number of good mines carrying gold are claimed to have been found.

Work has been prosecuted in Grand Island district during the year on four tunnels, the Idaho, Two-Seventeen, Red Cross, and Summit. The latter, which is running from the valley of the Middle Boulder for Caribou Hill, is between 400 and 500 feet in length.

The principal mill of the county is the Nederland Mill, belonging to the Caribou Company. The subjoined report has been furnished to me by the courtesy of Mr. N. H. Cone, superintendent of the mill:

JANUARY 1, 1876.

H. J. DE BRUYN PRINCE,

Chief Agent Mining Company Nederland:

DEAR SIR: I herewith transmit to you my yearly report of the operations of the Nederland Mill, embracing the production, loss, and expenses; with a general review of the different departments of the mill, and the changes circumstances have permitted me to make.

In preparing this, I have adopted the same methods of tabulation as in my monthly report. The average assays for the months of January and April were estimated in the same manner as were the months of February and March, copies of which were handed in on the 1st of May. In some of my former reports I have mentioned the inaccuracies that were liable to occur in taking dry weights at the batteries, and, in looking over the figures of those months in which custom-ore and dump-ore were run besides the regular Caribou ore, it appears that dump was credited as Caribou ore, causing a large percentage of moisture for the former and a very small percentage for the latter, when exactly the reverse should be the case, as the dump at no time exceeded 3 per cent. of water.

PRODUCTION AND YIELD.

Number of tons treated.....	3, 819, 328
Bullion, (ounces).....	169, 978
Average assay per ton, (ounces).....	46. 3
Average fineness.....	827. 3

Making a saving of 82 per cent., or an average loss of 8.4 ounces per ton of ore.

EXPENSES.

In making this part of my report, I have inserted, in place of "apparent loss of quicksilver," the amount of mercury purchased at the average price per pound, and estimated loss as follows:

Quicksilver on hand January 1, 1875, (pounds).....	2, 287
Quicksilver purchased during 1875, (pounds).....	1, 989

Total, pounds.....	4, 276
On hand January 1, 1876, (pounds).....	2, 012

Actual loss, (pounds).....	2, 264
Corresponding to a loss per ton of 0.59 pounds.	

COST OF TREATMENT PER TON.

Pay-roll, salt, wood, oil, candles, &c.....	\$46, 201 56
Loss of quicksilver, 2,264 pounds, at \$1.19.....	2, 698 88
Castings purchased.....	3, 230 41
Five per cent. on value of mill, \$60,000.....	3, 000 00
Total cost.....	\$55, 130 65

Corresponding to a cost per ton of \$14.43.

I have now ascertained, with as careful and conscientious computation as possible, the two most important results of the year's work, and have mentioned these estimates where inaccuracies are liable to occur.

To me, as superintendent of the mill, the knowledge of these results is of great interest and value, for my predecessor left no faithful record that I have been able to find, and what facts were obtained were too general to be of any material assistance. In milling, as in everything else, perfection is only gained by practice and experience. I desire, therefore, to examine into the items of loss, and suggest what changes are necessary to prevent them in the future.

1st. *Loss occurs in the batteries in the fine dust blown away.*—As yet, I know of no practical means of positively preventing this. Suction-fans have been tried in other mills, but with no flattering results.

2d. *Loss occurs in the smoke-stack.*—It has been claimed that the silver passes off with the volatile gases; but I do not think that can be the case, as we have too large an extent of dust-chambers, but that it is a mechanical loss, as there is a very strong draught, and I think a marked improvement would be seen if the stack were cut down ten feet.

3d. *Loss occurs in the breakage of the battery-screens*—allowing coarse particles of the ore to pass to the cylinder-hoppers.

4th. *Loss occurs through entering of the ore in roasting.*

5th. *Loss occurs through grease getting into the amalgamating-pans*—through flouring of the quicksilver, and through insufficient roasting.

The changes I would suggest to prevent these are: 1st, pipes and suction-fans for

the batteries ; 2d, screening of the roasted ore ; 3d, the substitution of barrels for pans in amalgamation. Expenses can further be reduced by drying and pulverizing the salt, and thereby shortening the time of roasting and the consumption of wood.

A conveyor should be built to carry the ore from the cylinders to screens, in order to separate the sintered lumps from the well-roasted fine ore. This does away with three men, and will not cost over \$2,000.

RECAPITULATION.

Wet Caribou ore, (tons)	3,769.240
Dry Caribou ore, (tons)	3,171.199
Dry Caribou dump, (tons)	366.155

Total Caribou ore, (tons) 7,306.594

Assay per ton, (ore)	47 ounces.
Assay per ton, (dump)	28 ounces.
Wet custom-ore, (tons)	317.893
Dry custom-ore, (tons)	282.040

Total ore treated, (tons) 7,906.527

Average moisture	7.2 per cent.
Average assay per ton of custom-ore	62.6 ounces.
Average assay of chlorinations	89.5 per cent.
Average time of roasting	10 hours.
Average assay of tailings	5.3 ounces.
6,690 pans produced of amalgam, (pounds)	27,040
836 pans scraped, of amalgam, (pounds)	30,263

Put in retort, (pounds) 57,303

Weight of crude ballion from retort, (pounds)	12,150
Weight of 112 bricks, (ounces)	169,978
Average fineness	527.3

EXPENSES.

Pay-roll	\$23,600 74
Quicksilver	2,371 32
Salt	7,999 82
Wood	13,111 00
Oil, candles, &c	1,490 00
	<u>48,572 88</u>

CASTINGS PURCHASED IN 1875.

Blake Crusher :		
28 chills	7,391 pounds	\$545 46
16 side plates	447 pounds	31 29
Steel lever, toggles, connection and joint	1,866 pounds	182 29
Freight from Black Hawk	3,898 pounds	58 47
Freight from Chicago and Cincinnati	5,806 pounds	130 63

Total 9,704 pounds 948 13

Old iron sold at Black Hawk 6,458 pounds 226 45

Actual cash cost 722 68

Battery :

47 shoes	5,358 pounds	330 01
30 dies	2,259 pounds	137 54
400 feet wire-cloth, 40x40		368 52
10 cams	1,800 pounds	156 00
2 cam-shaft boxes		26 00
3 cam-shafts		109 75
Freight		216 46

Total 1,344 28

Old iron sold 68 85

Actual cash cost 1,285 43

Cylinders:		
Pinion diaphragms.....	6,539 pounds.....	537 52
Re-lining fire-boxes.....		75 00
Re-lining cylinders.....		100 00
Total		712 52

Pans:		
Millers, shoes, shieves, dies, shields, &c.....		509 78

SUMMARY.

Crusher.....	722 68
Battery.....	1,285 43
Pans.....	509 78
Cylinders.....	912 52
Total	3,230 41

Ward district is still alive, though not more active than during last year. The Stoughton, Columbia, and Ni-Wot have been worked, the first two with no remarkable results, but the last with more success.

The cessation of continuous work on the Ni-wot several years ago was caused by the disappearance of all ore in the lower workings, the vein having "pinched." The yield of the mine had previously been magnificent, and probably there is no finer hoisting-machinery and no more complete mill in the Territory than this company erected while in bonanza. After a long period of unremunerative work, during which the main shaft was deepened at a cost of from \$30 to \$60 per foot, the discouraged stockholders discontinued further extensive operation, and for some time the mine has been in the hands of Mr. Tobie, the old superintendent, who has always had unlimited faith in the lode, and who has been exploring the mine little by little in the hope of striking a new body of ore. In August his unremitting labors were rewarded with success. What is supposed to be the continuation of the old ore-body was found some distance east of the main shaft, and has since been opened to a large body of fine "peacock" ore, varying from 2 to 6 feet in width. Besides this rich zone, there is also from 2 to 7 feet of good mill-ore exposed.

A company has just been formed on the Columbia lode, with a capital of \$1,000,000.

Some interesting experiments have been made on Stoughton ore in the way of concentration with a new style of machine, known as Pomeroy's percussion-table. On the small scale on which they were made I can report no results of value, but the model-machines worked well and will be replaced by larger ones. A company has been formed on the patent, and large works are to be built at Boulder City, to put the invention in operation. The tables are set on a slight incline, about 2° from a level, and have a horizontal, back, and forward motion. The ore, crushed to a great fineness, is fed in with water at the head, and the motion of the table gives the effect of a wave motion to the water. I need hardly say that the principle is an old and well-known one. Judging from the above description, which is all that my correspondent has furnished me, this apparatus presents features which have been superseded in the best modern percussion-tables. Whether it has any new and counterbalancing advantages I cannot say. Of course, like any other single machine, it will be inadequate for the systematic dressing of ores. The objection, which from the start attaches to its universal use for dressing, is the fine pulverization required for the ore, when no doubt the bulk of the mineral might be saved by jigging coarser stuff, and

thereby avoiding the serious losses always connected with fine pulverization.

The Telluride mines.—There are now five districts in the "Tellurium belt," viz: Magnolia, Gold Hill, Sunshine, Springdale, and Providence. Taking them in regular order, as named, the following data will show the condition of the most prominent mines at the close of the year.

Magnolia district.—The Keystone shaft has reached a depth of 75 feet, and levels have been run 35 feet from the surface 50 feet each way. Since its discovery, in August, the mine has produced over \$20,000, and has opened a body of very fine-looking tellurides of gold and silver, equal to any yet found in the county. Ore was found without a break from the surface to the bottom of the shaft, where there was a vein of mineral ranging from 2 to 7 inches in width, that would mill as high as \$600 per ton. The average value of the ore so far shipped has been about \$700.

The Mountain Lion is a northerly extension of the Keystone. Thirty-five feet from the surface pay-ore was found, and has held out well to the present bottom of the shaft, which is 50 feet deep. It has more than paid its own expenses, without any stoping.

The Little Dorrit was discovered in July, and has shipped since then about \$4,000, the ore averaging about \$300 per ton.

The Dunraven has been opened to a depth of 50 feet, and has turned out some very fine ore. Several shipments have been made, worth from \$200 to \$300 per ton. The pay-streak is narrow.

The Adabazar is opened by two shafts, each 20 feet deep, and has shown small seams of the usual telluride ore, very rich, but very precarious. The vein is one of six lodes belonging to a company, which also own a site for a tunnel which is to cut them all.

Gold Hill district.—The Melvina, discovered in June, is one of the most remarkable discoveries of the year. It is located on the ridge between the Four-Mile Creek and Gold Run. The first lot of ore shipped weighed 1,500 pounds, and brought \$8,360 at the smelting-works. While sinking the shaft the first 25 feet nearly \$20,000 was taken out, and from the time of discovery up to the close of the year over \$37,000 was produced from developing work only, without stoping. Of course this was the result of sinking directly on the top of a very rich pocket. The mine continues to ship ore with regularity that mills on an average over \$600 per ton. The shaft at the close of the year was something more than 100 feet deep.

The Slide is the name given to a new discovery made in July on the northern slope of the hill, and just above the Corning tunnel. Its first ore yielded "in the thousands," being a combination of tellurides and native gold. The vein was developed at first by an open cut. Since then a shaft has been sunk to a depth of 60 feet, and the ore has been found to hold out well. Subsequently the mine was sold for \$40,000, and is now being developed by an adit-level, which will intersect the shaft some 10 feet below its present depth.

The Cash, on the north slope of the hill, is an old discovery. Last summer it was "capitalized" and thrown on the Denver Stock Exchange. The transformation has not apparently been a fortunate one, for, although the mine has been considerably developed and has reached a depth of 150 feet, the stock has gone down very much. The average of ore does not carry much of the tellurium minerals, and has yielded in mill about \$20 per ton, mostly gold. The vein is one of the strongest on the hill.

The Sterling, probably an extension of the Cash, is at present producing some remarkably rich tellurides, thus leading to the conclusion that the workings of the Cash Mine are on a poorer part of the vein.

The Red Cloud has been idle during the entire year, excepting that in October an effort was made by driving on some of the upper levels to find a continuation of the rich ore-body that had made the mine famous. The effort was, however, unsuccessful. There is no lack of ore in nearly all parts of the mine, but it is of too low a grade to be shipped, and there are no means near by, either to concentrate or to amalgamate. The shaft was at the time work was stopped about 420 feet deep.

The Coldspring continues shipping ore regularly, as it has done for two years past. The actual production of 1875 was small compared with that of previous years, but the grade of the ore remains as high as ever. The main shaft is 300 feet deep, and about 1,200 feet of levels and winzes have been run. Nearly a year ago a cross-cut was driven west from the main shaft, and cut at 20 feet a new vein of tellurium-ores, upon which a new shaft has been sunk to the depth of 230 feet. This cross-cut has been driven 30 feet from the east wall of the vein, (which is porphyry,) but no indications of the foot-wall have been found. The new vein is, therefore, probably but a seam of the main fissure. It is somewhat pockety in nature, like the old one upon which the main shaft was sunk; but the ore is continuous, seldom, if ever, disappearing entirely, and often expanding to a width of several feet. In driving this cross-cut several minor streaks of mineral were intersected, and it appears quite certain that the entire width of the fissure is crossed irregularly by such seams. The experience of the Coldspring Mine has greatly encouraged deep explorations in other telluride veins of the county, for there is at least the proof in this property that the mineral is not found near the surface only.

The Victoria lies about 2,000 feet below the Cash. It was, in common with the Cash, capitalized in the fall and placed on the Denver exchange. It has been shipping ore regularly since then, and is considered one of the best mines on the hill. The workings have been extended to a depth of over 200 feet, and suitable surface improvements, such as hoisting and pumping machinery, have been erected over the shaft.

The Horsfall and Alamahee are still idle, though presenting good inducements to development. West of the town of Gold Hill is the Washington Avenue Mine, a property which many years ago attracted much attention. It was re-opened during the summer, and now is in a condition to ship large quantities of ore regularly. The ore is galena, with pyrites of copper and iron and some zinc-blende. Gold Run is dotted with miners' cabins from source to mouth, and numerous mines of minor note, but of great promise, have been opened during the year. In this gulch are the camps known as Salina and Camp Tellurium. The mines are located on both sides of the gulch, crossing it in every direction and offering excellent opportunities of advantageous development. At the mouth of the gulch, in Four-Mile, are several tunnels, projected to penetrate underneath Gold Hill or Sunshine.

The Corning tunnel, which enters the northern face of the hill from the cañon of Left Hand, has been driven 800 feet, and is steadily advancing. Its objective point is undoubtedly the porphyry dike, on the north side of which is the Cold Spring, and on the south the Red Cloud. Several good veins have been crossed by it already, on one of which work is now prosecuted.

Sunshine district.—The American sustains its reputation more thoroughly than any mine yet opened in the tellurium belt. Under the management of Mr. J. Alden Smith it has been developed systematically and economically; and though the workings cannot yet be considered very extensive, they show the vein-fissure to be well charged with ore

and quite regular in its formation. The shaft has been sunk to a depth of 100 feet, and 500 feet of levels have been driven. Good hoisting and pumping works are erected over the shaft, and there are convenient arrangements for sorting the ore, which is an item of great importance in this class of mines.

The shipments of ore have averaged about twenty-seven tons per month, netting about \$10,000, the year's production being, as nearly as I can learn, about \$125,000. This is certainly, if correctly reported, a remarkable yield for a mine opened to so small an extent. The ore furnished by the American contains all the various tellurium minerals so far found in the county, besides considerable free gold in small grains or scales and filiform segregations.

Of the other mines in Sunshine but little can be said that is new. The Grand View, Osceola, Phil. Sheridan, Consolidated, Glendale, Shoo-fly, Warsaw, Charcoal, Young America, Little Giant, Augusta, Yosemite, and others are working, and nearly all are doing well.

Springdale and Providence districts.—Springdale is located in a gulch running southward into Left Hand. The number of prospects is legion, but the only mine that has been worked to any great extent is the Ellen. From this a considerable quantity of tellurides of the richest kind has been taken.

Providence is located in Jim Creek, and its mines are the John J. and the Last Chance. Being as yet slightly opened, (neither is deeper than 30 feet,) it can only be said that they have produced some exceedingly rich ore of the usual tellurides. In this camp also the prospector has been busy on every side, and the number of claims staked is beyond the power of an ordinary mortal to enumerate.

LAKE COUNTY.

The valley of the Upper Arkansas is the only mineral district in this large county yet opened by the miner, if I except the workings on the headwaters of the Gunnison and Uncompahgre, which are included in the present report under the head of the San Juan region.

The industry is mainly placer-mining, though a few quartz-ledges are operated. Mr. Van Wagenen gives the product of the county as follows:

	Currency.
Quartz-gold from Printer Boy.....	\$30,000
Quartz-gold from other mines	3,000
Gulch-gold	42,000
Silver-ore	25,000

	100,000
Or, in coin.....	86,200

Mr. Maurice Hayes, the territorial assayer, at Oro City, gives the production of the county as follows:

	Currency.
Gold from the gulch-mines and Printer Boy Mine.....	\$95,940
Silver, copper, and lead from the lodes.....	25,000
	120,940

But I suspect that the last item includes ores which, also raised from the mines, have not been beneficiated, but lie probably at the works of the Cincinnati company, (under the management of Mr. Loe-

scher,) which have not been in operation. It is, therefore, to be expected that this item will appear again in next year's estimate.

There is still no market for silver-ores in this county, and this circumstance hinders all mining enterprises in that direction. Several attempts are making to correct this disadvantage, and it is probable that in another year the Arkansas Valley will be supplied with one or more works. In California Gulch Captain Breece is building chlorination-works, under the superintendence of Mr. R. Keck, and expects them to be in operation by February. At the mouth of the gulch another company has put up smelting-works, which have, however, not been in operation, and in Chalk Creek Messrs. Chapman and Riggins are building works of ten tons' capacity to treat ores from their own mines. The plant of this establishment comprises two roasting-furnaces and one blast-furnace. It is not expected to be in operation before the summer of 1876.

In the mines there is but little new. Those which were worked last year are, with a very few exceptions, still in operation, and attaining just the degree of success which encourages a continuation of labor. The experience of years in the gulches emptying into this valley shows that the ores are, as a rule, very low in grade, and require more capital than the prospector and the miner generally possess to develop them to a point where they can steadily pay.

The Printer Boy was worked steadily during the latter part of the year. Developments have not been pushed much below the depth at which work was last stopped, but the mine has been explored laterally with fair results. The yield of the mine was about \$30,000. A full account of the workings is given below.

The Berry tunnel, which runs upon a lode of the same name, is one of the important enterprises of the county. The lode has a width of 8 to 12 feet, and carries copper and iron pyrites, partly rich in gold and silver. As far as opened the vein shows plenty of ore, but of low grade. The chlorination-works spoken of above are being built for the special purpose of treating the material from this mine, though if they prove successful they will be enlarged for custom-work.

Excepting a little "gouging" done by lessees, the Home Stake, which at one time was considered one of the finest mines of Colorado—the best certainly on the Arkansas—has been idle during the year. Differences among the owners and disappointment in deep developments have been the cause. The property has now, however, fallen into the hands of one of the former owners, Capt. James Archer, and it has been the expectation to reopen it during the winter. It was currently reported some time ago that the mine was exhausted, but this is not the case. At present there is but little ore exposed in the workings, (which have been quite extensive,) but this is the result of poor management in handling the mine. It will be remembered by readers of former reports that it was from the ore of this mine, treated at the Golden City works, that so much nickel was taken.

The Chalk Creek mines are mainly on galena-veins. A number have been worked during the year by the company which is putting up the smelting-works on the creek, and it is expected that they will in time furnish a large amount of ore, carrying as high as 35 per cent. lead and 40 to 70 ounces silver. At the close of the year several hundred tons were on the dumps and several of the mines were to be worked throughout the winter. Those which the company own, wholly or in part, are the Riggins, Naomi, Tecumseh, Black Hawk, Anna, Mary Murphy, and Mount Yale.

Of the other mines in the Arkansas Valley that have been worked more or less, may be mentioned the Pilot, Yankee Blade, Five-Twenty, American Flag, Mike, Gray Bird, Hidden Treasure, and Mary Francis.

The placer-mines of the Arkansas Valley have produced about \$42,000, considerably less than last year. California and Cash Creeks have been the most actively worked; but even in these localities operations have been languid and intermittent, little more being done than was required to procure gold for the immediate personal necessities of claim-owners.

In regard to California Gulch, which is by far the most important mining-camp of Lake County, I have received later notes, which I owe to the courtesy of Mr. Rudolph Keck, M. E., formerly territorial assayer at Fair Play, and now engineer of the beneficiating works connected with the Berry tunnel enterprise.

Near Upper Oro City California Gulch runs east and west. On the mountain-side south of it several parallel lodes running north and south have been discovered in porphyry, the most noted being the Printer Boy, which has produced at least \$600,000 during the few years since its location. The vein, like the parallel lodes on both sides, is filled with porphyry, which is, however, softer than the country-rock, and of a different color. It contains, in very irregular distribution, nests of carbonate of lead with native gold, the latter occurring in particles far smaller than those found in the placer-mines of the gulch. In the lowest workings of the mine the same gangue material has lately been reached as was found some time ago on the north side of California Gulch, in the Berry tunnel, namely, a talcose mass of auriferous iron and copper pyrites with a little galena and tennantite. According to a certificate of the territorial assayer of the county, a selected specimen of this ore contained 122 ounces of gold per ton. Several assays by Dr. Loesch, of the Malta Smelting-Works, showed from 3 to 4 ounces of gold per ton.

The vein is opened by means of three shafts and several levels, and that is split in two places for distances varying from 200 to 400 feet.

Most of the mining work has been done between the main and the line or middle shaft in the split highest on the hill and in the eastern branch of the vein. It was here that rich nests of carbonate of lead, filled with leaf-gold, were repeatedly found. The thickness of the vein proper and its branches varies between 1 inch and 4 feet, but may be called on an average 7 inches, the eastern branch averaging 6 and the western 8 inches. Besides the two splits referred to, the vein shows the peculiarity that it is, from the surface down to a depth varying between 100 and 200 feet, filled with cross-seams in the porphyry mass, which are from 2 to 3 feet thick and cut off abruptly by the steep eastern wall, while on the western wall they often continue for a short distance outside of the vein. They are filled with the same auriferous ore as occurs in the vein itself, only of different color and hardness. In addition to this the gangue mass, as far as its contents of gold and the differing hardness are concerned, shows a diverging vein-system within the fissure from the surface toward depth, something like the spread fingers of a hand held downward. Whenever such soft veins are joined by cross-seams the richness of the ore is said to be greatest. The inconsiderable difference of outer appearance between the porphyry of the walls and that of the vein-matter, which can be distinguished with still less certainty in the comparatively dark workings, renders it often very difficult to follow the real ore-deposit.

The line or middle shaft has been sunk on the line between two claims,

the upper one of which belongs to the Philadelphia and Boston Gold-Mining Company, and the lower or northerly one to a few inhabitants of the vicinity. The latter is, however, leased to the company just mentioned, and it is here that the rich pyrites spoken of above has lately been found. It is to be regretted that for the present at least it cannot be extracted, because without powerful pumps the water struck at the same time cannot be overcome. The material is much desired and needed by the Malta Works as a flux.

The ore in the western branches of the two splits is decidedly softer than that in the eastern ones, but so far it has not shown any such rich pockets as the eastern upper branch between the line and the main shaft. The eastern lower branch between the line and the lower shaft has so far not been developed. At the lowest depth, just before the rich pyrites was struck, the contents of the ore in gold were very small. At the same time it must be remarked that the vein above this point is by no means exhausted, and, considering the former carelessness of management, this field is very promising. A little over 100 feet deep in the main shaft a mass of boulders, with a little iron-pyrites and fine gold, was found, which Mr. Keok thinks may either be taken for the bed of a former stream or for the remaining moraine of a former glacier. I do not find it necessary to adopt either hypothesis. The presence of rounded boulders, unless they are clearly of a material different from the country-rock, may be the result of attrition and water between the vein-walls. This phenomenon is expressly considered by Von Weissenbach, in the classification of "veins of attrition," contained in his Theory of Veins, as published in Von Cotta's *Gangstudien*.

At the depth of 200 feet in the line-shaft, and of 100 in the main shaft, the cross-seams mentioned above were no longer met with, and south of the latter the vein is not split at all. At this point, however, so little systematic work has been done that no conclusions as to increase or decrease of richness can be drawn from the altered geological conditions. Indeed little systematic work has been done on any part of the whole vein. Former operations were principally confined to robbing the rich pockets, while good milling-ore was left standing.

The gold contained in the pyrites just discovered, although it can be partly washed out, cannot be directly amalgamated, behaving in this respect like that in the ores of the Berry tunnel.

Among the veins running parallel with the Printer Boy, the Five-Twenty is at present the most promising. The ore from this mine yielded in the battery alone 8 ounces gold per cord, or about 1 ounce per ton. The mill-gold of these veins is usually worth \$15, coin, per ounce, while the wash-gold of the gulch is worth from \$17.75 to \$19.

Of the production of Lake County during 1875, now estimated at over \$120,000, currency, three-quarters are said to come from California Gulch.

The placer-mining of the gulch, an industry which has now been in existence for sixteen years, is really a still worse robbery of the gold-deposits than that carried on so long in the veins. The gold occurs in these placers, notably in the upper part of the gulch, in two different layers. The upper one consists of gravel and conglomerate, and is the deposit which alone has been washed; the lower one consists of so-called cement, a hydrated oxide of iron combined with a feldspathic mass to a very hard layer, which contains not only fine, and very fine, gold-dust, but also coarse gold. As the hardness of this material precludes washing without a preliminary crushing, this layer is to-day virtually virgin

ground, a fact which is the more remarkable since assays of average samples have never yielded less than an ounce of gold per ton.

At the Berry tunnel Mr. Keck has completed his beneficiating-works as far as was intended for the present. While up to the end of the year only the common ores of the Berry tunnel (talcose gangue with iron and a little copper-pyrites) were subjected to the process* employed, the mine has been better developed, and now there is a considerable quantity of more solid and richer ore ready for extraction, similar to the pyrites described above in connection with the Printer Boy. This ore is now assorted by hand, dried, in order to stamp it without water, and subjected to the rest of the beneficiating process. It is to be regretted that for the amalgamation of the residues arrastras only are at Mr. Keck's disposal, since the gold is in this way not extracted as perfectly as could be done in pans.

The Malta Smelting-Works are built on the slope of a hill, and intended for lead-smelting. Besides the necessary buildings and apparatus for crushing, sampling, storage of wood, &c., they contain a long reverberatory furnace for roasting, (without a hearth for slagging purposes,) a shaft-furnace of the Kast pattern, of a capacity of at least 15 tons per day, and an English cupelling-furnace. The blast is furnished by a Sturtevant blower, No. 4. The establishment impresses the visitor favorably, and it is only to be hoped that in the coming summer the argentiferous-lead mines of the vicinity (so far containing principally cerussite) may be more energetically attacked than has been the case heretofore, in order that the metallurgical enterprise may not be crippled (as so many in Colorado have been) by the lack of material suitable to the processes employed.

SUMMIT COUNTY.

The metallic product of this county is placed at \$76,000, being wholly gold-dust from placers. There has been also a yield of probably \$10,000 from the Snake River mines which would belong to Summit, but which is included in the statements of Clear Creek, nearly all of it being sold there. The properties worked during the year are the same as those of last season, with a few additions. The Summit County placers being located at so high an altitude, can be worked successfully in good seasons only. The last season was but a tolerable one, and expectations were, as a rule, not realized. Fully as much ground as usual was opened, but the water-supply gave out nearly a month earlier than usual, and all ground worked by booming had to be abandoned. This system of washing is doing good work in the Blue Valley, and though it may be considered, in comparison with the more extensive and complicated systems of California, as rather primitive, it has peculiar merits of its own not to be despised. It has been described in former reports.

In French Gulch and its tributaries, Dry Mayo, Humboldt, and Nigger Gulches, Calvin Clark, I. H. Fuller, J. J. Cobb, and the Badger Company have been at work as usual. The production of the gulch (which is by far the best at present in the Blue Valley) has amounted to about \$40,000. Georgia Gulch and Gold Run have together yielded about \$13,000; about \$1,000 have come from other minor localities, such as Galena, Iowa, and Lomax Gulches, and Stilson, Buffalo, and Dela-

*The process followed consists in stamping, dressing on fine-grain-jigs, roasting with salt, lixiviation, precipitation of copper and silver, and amalgamation of the auriferous residues.—R. W. R.

ware Flats; and \$15,000 may be credited to claims located directly in the main valley.

Of the new projects which have developed during the year into a condition of productiveness, the Izzard diggings are the most notable. Concerning them a correspondent of the Alma News reports the following:

Izzard's diggings are located about three miles south of Ten-Mile, on the west side of Blue River, and between 7 and 8 miles north of Breckinridge.

Four years ago if anybody had predicted that valuable and extensive placer-mines would be discovered between Gold Hill and the confluence of Ten-Mile and Blue Rivers and costly improvements added, he would have been considered an idle talker. So little faith had the "prospector" in that particular area that it always received the go-by. It was not until the spring of 1873 that any prospectors ventured a location. A party of two men made a pre-emption in one of the series of gulches, taking up 409 feet in length, with suitable width and 200 feet front, and doing a little work. Mr. J. E. Izzard, a Philadelphian, and a gentleman commanding considerable capital, had been testing lode-property about a mile and a half southwest of Gold Hill. Not meeting with anything encouraging, he abandoned it. His attention was next attracted to the locality now familiarly known by the name which heads this article. After prospecting awhile, he made up his mind that a large area of gulch and hill placer, having gold in paying quantities, existed in that vicinity. His next endeavor would naturally be to pre-empt all the territory that was likely to have pay, and secure the water flowing through that region which could possibly be brought upon the premises. The extent of ground to which he has secured possessory right is about 500 acres, having a front on Blue River of over 5,280 feet, and running west up a number of gulches and over gravel ridges and hills, in many instances as much as 13,200 feet, taking up and securing the water of 20,000 acres, affording during the flush a quantity as much as 4,000 inches, miners' gauge. The principal stream, and that which furnishes his largest supply of water, is called Miners' Stream. Barton, Izzard, and a number of other gulches unnamed, the springs and marshes with which this region is so bountifully supplied, constitute his water-privileges.

Miners' Stream runs north and empties into Ten-Mile. On this stream Mr. I. has put in a dam, conducting the water thence through large and well-constructed ditches, distributing it by a net-work of branch ditches to all his mines, which lie off east, changing the natural water-courses lying north and south, making those of the former flow south and east and the latter north and east. In the spring of 1873 he commenced the preliminary operations of surveying and digging ditches, sinking shafts, delivering lumber, and erecting cabins. At the close of the season he and his family visited their old home. Returning next season, a force of thirty-five men was set at work enlarging and extending ditches, building boom-flumes and reservoirs. The season closed without finding bed-rock. Leaving two men to finish uncompleted work, he and family left for Denver for the winter. This summer he employed from three to eight men, and late in the fall a depth was reached where increased pay came in, but no bed-rock, and in twelve days sufficient gold was taken out to pay the season's expenses, leaving him the net sum of \$400. The gold assays 843 fine, and is worth \$17.42 per ounce. Since the close of the mining season, a shaft has been sunk reaching bed-rock at 40 feet from the surface, prospecting from 8 to 36 colors heavy gold to the pan all the way down.

Poverty Flat.—In the districts bordering on North Park, in the gulches flowing from Hann's Peak, some very promising placers are being opened. Gold was first discovered in this camp by Sam Conger, of Caribon fame, in the summer of 1869, and, without causing much of an excitement, the district last year developed into what will without doubt prove next year a very valuable addition to our mineral lands. Two large companies, the Hann's Peak and the Purdy, have absorbed, by location and purchase, the best parts of the district, owning between them about 1,250 acres, located on Poverty Flat and Way's Gulch. Their combined capital is \$6,000,000, and the total amount of improvements up to date have cost in the neighborhood of \$100,000. Twenty miles of ditches have been dug, and it is proposed this year to build several new ones of a total length of 12 miles, which will bring 5,000 inches of water additional into Way's Gulch.

Poverty Flat is on Beaver Creek, one of the tributaries of the Elk River. The elevation of the Hann's Peak Company's claim, which is

on this flat, is about 8,000 feet. The ground is from 10 to 60 feet deep, of gravel, free from large bowlders, and pays well through its entire depth. Last year but one run of 25 days with one hydraulic was made, which washed out \$3,500 in gold. The company is now arranging to work 12 hydraulics, and has a constant water-supply equal to about 2,000 inches. Five reservoirs have been built, by which means the supply can be maintained quite late in the year.

The Purdy Company, located in Way's Gulch, will put in this year a bed-rock flume, and probably will not take out much gold till 1877. The ground is as good as that of the Hann's Peak Company, but not so well located as to water. Hence the necessity of the 12-mile ditch from the Elk.

Several very promising gold-bearing lodes have been discovered at Hann's and Way's Peak, upon which work will be done this year. It is expected that the year's work will develop a splendid gold-district in Grand County, which will have the effect not only to draw an agricultural population to the valleys of the Bear and Grand, but to incite further explorations in the numerous mountain-chains around the North and Middle Parks, which are as likely to be rich in minerals as any in the Territory.

The Rabbit-Ear mines.—In the range of mountains dividing Middle from North Park are the Rabbit-Ear mines, about which but little can be said, except that the prospects are fair. The mines are numerous, large, and easily worked. They carry mainly silver-ore, and some of them show good veins of argentiferous galena. But little development has been made, no workings having been extended deeper than 50 feet, and the majority of the claims being only sunk 10 feet. Numerous companies have been organized and several tunnel schemes proposed, and next season will demonstrate whether the discoveries are of any value. The camp is 60 miles from the nearest reducing-works. It is proposed to put up a mill in the district next year, should the supply of ore warrant it.

The Lincoln City Lead-Works have been idle during the year, having fallen into legal troubles.

Snake River district has been steadily but slowly improving, and of *Peru district* the same may be said. The Champion, Tiger, Printer's Pool, Peruvian, Blanche, Orphan Boy, Silver Wing, Potosi, Cony, Sukey, and the Comstock tunnel mines have been worked with considerable regularity during the year, and all but the last have shipped ore.

The Sukey Mill made a short run in the summer, but was unsuccessful. The Saint Lawrence Mill has been transported to Georgetown and sold to the Pelican Company.

The operations of the Boston Silver Company, at Saint John's, have been steadily prosecuted during the season. The company continued to drive its long tunnel into Glacier Mountain until, on the 20th of November, it had reached a length of 1,075 feet. It is well constructed throughout, being 7 feet wide by 9 feet high, and in all places, where the rock is not sufficiently hard, timbered in the most substantial manner. Eight veins have been crossed so far, Nos. 1, 2, 3, 4, and 6 showing at the points of intersection quartzose gangue and iron-pyrites; Nos. 5 and 8, a similar gangue, with zinc-blende and galena; and No. 7, heavy spar, galena, and blende, with little iron-pyrites. All the veins, with the exception of No. 8, are very large, some of them extraordinarily so, as, for instance, No. 5, which at the point of intersection is about 20 feet; and No. 2, which is 83 feet thick. The latter carries such soft vein-material (broken quartz with iron-pyrites) and delivered when opened such vol-

umes of water, that it was found necessary to timber closely the whole 83 feet, sides, top, and bottom, with 12-inch timbers, (sets of 10-inch timbers 3 feet apart, which had first been inserted, having been broken like reeds by the enormous pressure.) Just before the driving of the tunnel was temporarily stopped, a ninth vein had been struck and entered into for 3 feet, which carried quartz and iron-pyrites. The opposite wall not having been reached, the value of the vein is unknown.

At the time above named positive orders from the directors of the company in Boston forbade the continuance of the tunnel for the present, and ordered the development of Nos. 5 and 7 by drifts and rises. This work has since been going on uninterruptedly, 30 miners having been employed on an average, and with most unexpected results. The north drift on No. 5 was 200 feet long at the end of the year, the vein-material having been soft throughout that distance. When the drift had progressed so far, a very serious cave occurred about 170 feet from the entrance of the drift, which delayed further driving for a month, and required timbers 2 feet in diameter for a distance of 50 feet to overcome it. A rise was started at the end of the year a little south of the cave. While at the intersection of the tunnel with No. 5, only galena, blende, and a little iron-pyrites were found, containing, when solid, 60 to 70 ounces of silver per ton; the vein carried beyond a point 75 feet from the entrance northward, besides the minerals named, rich silver-ores, such as ruby silver, stephanite, polybasite and tetrahedrite in considerable quantity, so that the average value of the ores was more than doubled. The south drift on No. 5 was in about 50 feet at the end of the year, and has since been driven to the intersection with No. 7, 140 feet from the tunnel. In this drift only one pocket of ruby silver, stephanite and fahlore was found. The drift on No. 7 north of the tunnel was at the end of the year about 60 feet long, and is throughout in very soft and dangerous ground, carrying no ore. The south drift was in about 200 feet, and showed ore (zinc-blende and galena in heavy spar) for almost the whole distance, the vein being on an average 4 to 5 feet wide, and the ore-streak varying from 1 to 3 feet. At a distance of about 180 feet from the entrance, the drift encountered a horizontal fault of 8 feet, (the vein being thrown to the east,) and 12 feet farther a second fault of 6 feet in the same direction. Between the two the vein carried very good galena. About 6 feet beyond the second fault the galena became very solid and contained much native silver, which continued for a distance of 30 feet. The ore in No. 7, at the intersection with the tunnel, contained in solid galena from 48 to 50 ounces of silver; at the further end of the drift, where native silver was visible, it contained from 100 to 500 ounces, and in ordinary galena from 70 to 80 ounces.

Since the end of the year, two rises have been started on No. 5, 170 feet apart, the northern one being at the time of this writing 80 feet and the southern 114 feet high. In the latter, north and south drifts 100 feet above drift No. 1 are being started. Besides this, stopping ground for 10 men is opened, and extraordinarily rich silver-ores, carrying, however, little galena, are now being extracted.

On No. 7 one rise, now 120 feet high, has been made, and drifts will be started north and south in a few days. There are three stopes opened on No. 7, two of which produce ore.

Little work has been done during the year in the upper mine on the Comstock lode (probably No. 7 of the tunnel) beyond the extraction of about 60 tons of solid galena. The stopes there opened will probably

be worked during this year, but no extensive work is intended there, until the connection has been made from the tunnel below.

At the end of the year the company had about 800 tons of ore on hand, about three-fourths of which is dressing-ore, to be concentrated in its very systematic establishment and to be smelted into pig-lead.

A dozen or more veins have been worked in Snake River district by other parties at intervals during the year, and some of the veins have produced rich lead-ores in small quantities. No large developments have, however, been made. The ores mined have mostly been bought by the Boston Silver Company.

PARK COUNTY.

I have nothing to add to what has been said in former reports as to the placers of this county, though I am informed in a general way that they are making satisfactory returns, particularly under a consolidation of ownerships and a more effective use of water. A few words may be said of the quartz-mines. On Mounts Lincoln and Cross the Moose, Dolly Varden, Hiawatha, Lincoln, Russia, Ford, Danville, and Security have been working steadily during the year. It is wholly impossible to give any intelligible statement concerning the developments on any. The entire story will be told by saying that in each case the ore-bodies have been diligently followed wherever they led, and if they suddenly pinched up to nothing, explorations have been turned in other directions. On none of these claims has there been found any regularity in the deposits. The entire stratum of blue limestone seems to be saturated with mineral, segregated in places to bodies of considerable magnitude. So far the Moose has seemingly had the monopoly of the big deposits, but the Ford and Russia promise to equal it shortly in quantity of mineral. The Moose has maintained throughout the year a steady production of about six tons daily, averaging in value about \$150 per ton. The Dolly Varden has done well also, and has yielded some exceedingly rich material. The Hiawatha has been under lease, and is consequently not in as good a condition as it might be. The Security has kept up a fair production, and is regarded as one of the coming mines of the district.

In Buckskin and Mosquito Gulches a large amount of prospecting and development has been done, and a number of very good veins have been opened; also plenty of poor ones. At the head of Buckskin is the London lode, a vein which is attracting a great amount of attention, and which undoubtedly is a rich and valuable property. The Phillips has not revived yet, though about five hundred tons of ore have been taken out during the year for fluxing purposes. In Mosquito, the Orphan Boy has been temporarily opened, and a tunnel has been started to cut it some 250 feet deep.

In Sacramento and Horseshoe Gulches a small amount of ore has been produced, mainly galena. The latter has been most productive, if either can be said to have yielded. The amount of prospecting done has also been large, and it is known that the deposits in that part of the limestone belt are large and worthy of better attention. Still, though not lacking in mineral wealth, Park County improves but slowly. This fact may be attributed to the poor ore-market which exists, and to the comparative inaccessibility of the district. The latter drawback to its growth will only be removed when the South Park Railroad, now connecting Denver with Morrison in the foot-hills, is pushed up the Platte Cañon to the Park. The former may be expected to cure itself.

FREMONT COUNTY.

Rosita.—Few mining-camps in the West can show so rapid and so healthy a growth as Rosita. In the summer of 1873 the first discovery of note (the Senator) was made. A little later the Pocahontas vein was found, which, with its extensions, is now one of the most important lodes in the Territory. The Greenhorn range, in which the camp is located, is crossed from the northwest to the southeast by an eruptive mass or huge dike of porphyry,* trachyte, and andesite, which culminates at the south in the Greenhorn Peak, and disappears at the north in Wet Mountain Valley. Within this mass, which is from 3 to 5 miles in width, are located all the mines of importance hitherto found in this neighborhood. Outside of the porphyry, in the granite, veins have been found, but they do not exhibit any permanence of character or any valuable features. Veins are also found on the edge of the eruptive rock, between it and the granite; but these also promise less than others wholly within porphyry.

The Pocahontas vein, which has been called the "mother lode" of the district, has a course approximately the same as that of the "dike," northwest and southeast. There are several fissures having a parallel course with that of the Pocahontas, and presenting many similar features, leading to the belief that this is the line of main fracture and also of first fracture. The latter opinion is confirmed by the examination of several places where these northwest and southeast veins are crossed by others. In every case noticed the latter break through the former with a clean fracture, and generally cause faults of several feet in the older veins.

These secondary veins do not appear to have any marked parallelism of direction, but are claimed by some, who have examined the whole district thoroughly, to bear toward the prominent peaks within the range of eruption; or, in other words, to radiate from these peaks as spokes from the center of a wheel. The only illustration reported to me in support of this theory is the west slope of the peak, on which occur the Invincible, Matchless, Chieftain, and other veins. This is hardly conclusive.

The Pocahontas vein has been traced and claimed for a distance of several miles. Commencing at the southern end, so far as at present known, the first mine is the South African, followed by the South Humboldt, the Humboldt, the Pocahontas, the Leviathan, and the reduction-works Leviathan. In the latter the vein appears to be split, one fork being known as the Leavenworth, the other as the Stevens. The last claims have not been developed sufficiently to show whether this is a real forking of the vein or a division of the ore into two or more seams. The latter is probably the case. The production of the camp in 1875 was as follows:

	Currency.
Pocahontas Mine.....	\$165,000 00
Humboldt and South Humboldt.....	62,000 00
Other mines.....	7,200 00
Total	234,200 00
Coin value	201,880 40

* I claim no personal knowledge of this locality, having seen the range at some distance only. But I hesitate to admit without further evidence the eruptive character of the country-rock containing the veins. Nevertheless, I leave the statement in the text as it was furnished to me.—R. W. R.

About 8,000 linear feet of mining-work, including shafts, levels, and tunnels, has been done since the opening of the camp. The production last year was 1,300 tons, showing an average grade of \$180 per ton. As the reduction-works were running but a very short time during the year, nothing but high-grade material has been marketed. There are now from 500 to 800 tons of ore, worth from \$30 to \$60 per ton, lying on the dumps, awaiting the opening of the home-reduction works. The ore is mainly composed of gray copper and copper-pyrites, carried in a gangue of heavy spar. Galena, iron-pyrites, oxide of copper, ruby and native silver, and native copper also occur. The percentage of copper is pretty high, and renders the ore unfit for amalgamation without previous leaching. No veins have yet been found on any part of the Greenhorn range carrying a heavy percentage of lead. There is likely to be some difficulty, therefore, in treating these ores alone by smelting.

Numerous promising discoveries have been made on the western slope of the Greenhorn range, in what seems to be a continuation of the same belt of porphyry. On the eastern slope of the Sangre de Christo range, which lies just across from the Greenhorn, (Wet Mountain Valley being between,) some discoveries of rich argentiferous galena have been made, and early in 1876 a new camp will be started in their neighborhood. On Grape Creek, which flows from Wet Mountain Valley into the Arkansas, there has been a copper excitement, and some outlay has been made for development. The results, however, have not been very satisfactory, and at the close of the year Copper Gulch was almost deserted.

The following is a statement of the condition of the Rosita mines at the latest date, (March, 1876,) received since this report was sent to Congress:

Pocahontas.—This mine is opened by about 1,500 feet of shafts and levels, nearly all of which has been driven since March, 1875, at which time it fell into the hands of its present owners. The mine is now worked through a tunnel 250 feet long. The vein of ore is from 2 to 5 inches in width, very regular and continuous, and mills between \$170 and \$200 per ton. The ore is a gray copper and copper-pyrites, in a gangue of heavy spar, in which is found, as occasional minerals, oxide of copper, (black,) ruby and native silver, a trace of gold, and often iron-pyrites and galena. Production from March, 1875, to January, 1876, 706 tons, worth \$123,468.31. From the latter date to March 1 of this year, 195 tons have been produced, worth about \$36,270, making the total yield for the year ending March 1, 1876, nearly \$160,000.

Humboldt and South Humboldt.—This property occupies 1,900 feet on the mother lode of the district south of the Pocahontas. It is opened by six shafts, of a total depth of 675 feet, and has 800 feet of levels. Shaft No. 1, which is the main working shaft, is at present 175 feet deep, and is being sunk steadily. The shaft is 30 feet in length, and is divided into a compartment for hoisting and one for ventilation. The ore-vein is steady and continuous in almost every part of the mine, and it is of the same character as that in the Pocahontas. The production of the mine during 1875 was \$62,000.

West Virginia.—Shaft 86 feet deep, northwest drift 90 feet long. The parties who have leased the mine are putting up a whim and preparing for extensive work.

Leviathan.—The shaft on this claim is now 65 feet deep and is under contract to 100 feet. A drift 50 feet in length has been driven south on the vein, exposing a good seam of rich ore, which shows extremely well. This mine promises to become one of the most valuable in the camp.

Invincible.—The shaft has been sunk to a depth of 142 feet, and a 60-foot level run 100 feet below the surface. There is a good quantity of

ore in sight, but it is of low grade. Better material is expected as greater depth is gained.

Polonia.—The Polonia shaft is 95 feet deep and is to be sunk to a depth of 125 feet before new levels are driven. Seventy-five feet from the surface drifts have just been started, with a good showing of ore.

SAN JUAN COUNTRY.

To the courtesy of Mr. N. A. Foss, superintendent of the San Juan Smelting and Refining Company, and late superintendent of Green & Co.'s works at Silverton, I am indebted for a very interesting report on San Juan, in substance as follows:

The San Juan mining country is situated in the southwestern corner of Colorado, bounded on the west by Utah, on the south by New Mexico, on the east by the one hundred and seventh meridian of west longitude, on the north by a line 20 miles north of the fortieth parallel. This vast region of over 30,000 square miles has never been prospected or explored to any extent outside of the 5,600 square miles relinquished by the Ute Indians in their treaty of September, 1873, and now comprising La Plata, San Juan, and Hinsdale Counties. The country is divided into six mining-districts, all of which, except Lake and Adams districts, are in San Juan County.

The Animas district includes all locations made on the Animas River and its tributaries to a point 2 miles above Howardsville.

The Eureka district joins the Animas at this point and extends to the divide between the waters of the Animas and those of the Gunnison and Uncompahgre.

The Uncompahgre district includes all lands drained by the Uncompahgre and its tributaries as far north as the Ute reservation.

Mount Sneffels district includes the sections drained by the Rio San Miguel.

Lake district includes all the locations made in Hinsdale County, except the mines situated in Burris Park, at the extreme head of the Lake Fork of the Gunnison, which constitute what is known as Adams or Park district.

Much has been accomplished during the last two years, notwithstanding the great distance from railroad communications, the inaccessibility of the country, and the want of capital for the development of a new mining-camp. More than five thousand locations have been recorded; two good wagon-roads have been built into the country, one via Del Norte up the Rio Grande, the other up the Gunnison via Saguache. Several flourishing towns have grown up, of which Silverton, the county seat of San Juan, and Lake City, the county-seat of Hinsdale County, are the principal ones, each having a population of some five hundred. The only mines that have been worked to considerable extent in the country are the Hotchkiss, in Lake district; the Silver wing, in Eureka district, and the Highland Mary, Aspen, Prospector, and Little Giant, in the Animas district.

The Hotchkiss, located by Hotchkiss Finley, is the best developed mine in the San Juan country. The strike of the vein is northeast and southwest; the vein-matter is 60 feet thick, and it was only in the latter part of February that what is considered the true ore-zone was found. There are two tunnels, 50 and 80 feet long, respectively, which give access to the vein. The ore consists of tellurides, containing in value about equal proportions of gold and silver. Specimen assays range from \$17,000 to \$20,000 per ton; 18 tons of ore shipped averaged \$1,318.61; 75 tons remain on the dump, valued at \$150 per ton.

The Silver Wing Mine consists of a group of ten lodes, situated on Jones Mountain; one mile above the town of Eureka. It is developed by one tunnel, 100 feet long; a second tunnel is under contract for 1,000 feet. This tunnel cuts all the veins from 300 to 1,000 feet below the outcrop. Assays range from \$130 to \$2,800; the ore contains iron, lead, and a large percentage of copper.

The Highland Mary, Rob Bruce, and Powderhouse claims are all located on one vein, all situated at the head of Cunningham Gulch, three miles above Howardsville. The workings consist of four tunnels, running in and along the vein, 300 feet apart, one above the other. The crevice is 15 feet wide, with an ore-streak from 9 to 30 inches wide. The ore is argentiferous galena. Sample-assays from first-class ore gave \$2,100; second-class, \$760; third-class, \$170.

The Prospector lode has probably furnished more ore than any other in the San Juan country. The mine is located on Hazelton Mountain, two miles above Silverton. The developments consist of two shafts, 100 and 130 feet deep, with a level 100 feet-long connecting the two, 100 feet from the surface.

The Little Giant, located in Arrastra Gulch, was the first location made in the San Juan country. The mine has a pay-streak of 8 inches of gold-bearing quartz. Twenty-seven tons, worked by the arrastra, produced \$150 per ton. In 1872 a company was organized in Chicago, known as the Little Giant Company, which erected upon this property amalgamation-works, containing a 12-horse-power engine, Dodge crusher and ball-pulverizer. The works were built 1,000 feet below the mine, with a wire tram-way to bring the ore to the mill. About 100 tons of ore were milled, producing \$14,500, or about 65 per cent. of the assay-value. The property has been involved in litigation since the spring of 1874.

List of producing mines in the San Juan country for 1875.

District and name of lode.	Crevice, in feet.	Pay-streak, in inches.	Character of ore.	Percentage of lead.	No. of ounces of silver per ton.	Coin-value per ton of 2,000 pounds.	Improvements.
Ankmas district:							
Silver Cord	1½	3	Galena	40	85	\$109 90	.....
Prospector, first class	4	7 to 10	do	60	375	434 84	.....
Prospector, second class					169	218 50	.....
Aspine, first class	4½	10 to 15	Galena	60	255	329 69	175 S.*
Aspine, second class					175	226 26	.....
Philadelphia, first class	4	12 to 24	Galena	45	591	647 74	70 T.*
Philadelphia, second class					224	259 61	.....
Susquehanna, second class	3	3 to 7	Galena	60	147	190 07	90 S.
Little Giant, a		8	Gold			225 00	.....
Eureka district:							
Lookout, a	6	24	Galena	50	225	290 90	.....
Mountain Queen, a	5	36	do	75	32	41 36	.....
Crispin, a	4	20	Gray copper		131	169 37	.....
Hartman, a	6	20	do		69	91 01	.....
Uncompahgre district:							
Saxon, first class	15	22	do		1,383	1,788 09	.....
Saxon, second class					600	775 75	.....
Poughkeepsie, a	25	60	Gray copper		223	283 31	.....
Alaska, a	2	3 to 7	do		612	791 25	.....
Tribune, a	20	24	do		117	151 27	.....
Lake district:							
Hotchkiss, first class	60		Tellurio			7,155 50	.....
Hotchkiss, second class						1,100 00	.....
Belle of the East, a	6	24	Gray copper		178	230 12	100 S.
Little Chief, a	5	18	do		769	994 24	
John J. Crooks, a			do		381	492 59	

* a signifies average; s, shaft; and t, tunnel.

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Total amount of ore smelted in San Juan for 1875, 1721 ⁰⁵¹ / ₁₀₀₀ tons; average value per ton, \$216.59; total coin-value.	\$37,361 82
Total amount shipped for treatment elsewhere, 481 ¹¹⁵ / ₁₀₀₀ tons; average value per ton, \$805.65; total coin-value.	39,135 06
Total amount of ore extracted, 221 ²⁰⁴ / ₁₀₀₀ tons; coin-value..	76,496 88
Average coin-value per ton of all ore extracted and treated or shipped	345 98
Total amount of bullion produced from the 1721 ¹⁵³ / ₁₀₀₀ tons was 60 ⁵⁰⁰ / ₁₀₀₀ tons, assaying \$540.35 per ton; coin value..	32,556 10
1,559 ounces silver refined in the country; coin-value....	2,015 63
Total	34,571 73

Loss in extracting, \$2,790.05, equal to 7²/₁₀ per cent. of the ore-value.

The coming season will witness considerable activity in both mining and smelting throughout the San Juan country. Seventeen mines are being worked during the present winter, which will produce by June 1 500 tons in the Animas district and 300 tons in the Lake district.

The next year's product of bullion, it is estimated, will be about as follows: Green & Co., Silverton, 1,000 tons ore, producing 400 tons bullion; value, \$550 per ton. San Juan Smelting Coompany, Forks of Animas, 600 tons ore, producing 240 tons bullion; value, \$400 per ton. There will be no refining done in the country next season, since the bullion can be shipped out, the lead paying the cost of transportation. Besides the two above works, which will be in operation by the 1st of July, the Rough and Ready Works, at Silverton, which have been lying idle for the want of capital, may be put in operation.

RIO GRANDE COUNTY.

Summit district.—This district is usually classed as part of the San Juan country. For the following very interesting account of it I am indebted to Mr. C. E. Robins, treasurer of the Little Annie Mining Company, at Summit. As will be seen from several dates given below, the account was received after this report was transmitted to Congress. I have felt justified in introducing it because of its value as a careful and, in some particulars, detailed exhibit of the actual condition of mining in that region.

Summit district, which is the leading gold-district of the San Juan country, is situated about 27 miles southwest of Del Norte, and lies just within the southern boundary of Rio Grande County. Its approximate latitude is 37° 30'; approximate longitude, 106° 30' west from Greenwich, with a mean elevation of about 12,000 feet above the sea. The surface below timber-line is for the most part heavily wooded with spruce and balsam, and covered during the three summer months, both above and below the upper line of the forests, with a carpeting of nutritious grasses, colored by masses of low-growing plants, representing a very large range of the Alpine flora of Colorado. The outlook from Summit Peak, 12,673 feet high, taking in the vast sweep of the Sierra Madre, Saguache, and Sangre de Christo ranges, a hundred miles in every direction, is one of the finest in Southwestern Colorado.

South Mountain, in which the mineral value of the district, so far as known, exclusively lies, is composed mainly of porphyry, quartzite, and feldspar. The quartz is in immense, but as yet undefined, masses, appar-

ently the result of overthrow in later Tertiary time. Whether or not it exists in depth in definite veins, is as yet an undetermined question, and for the present to the owners of rich locations a matter of remote interest, as there is enough in sight worth \$75 per ton in the mills to insure a large profit for a long time to come. The country-rock appears to be all Azoic; no fossils yet found.

Concerning the climate, data covering long periods do not exist. The winter of 1875-76 was the first during which the summit was occupied by men, so far as known, and it is presumed that it shared in the general mildness of the season throughout the Western Hemisphere. The lowest range of the thermometer was only 9° F., and the mercury passed below the Fahrenheit zero but three times. In February, snow was 12 feet deep on the level, and in drifts 60 to 70 feet deep. On the 1st day of May it was about 7 feet deep on the level, but disappeared rapidly after that time. Snow lies in the upper mountain ravines at all seasons, and there are large fields of it in such locations which have probably preserved their general summer outline during historic time. The ground beneath the surface is all at seasons frozen to an unknown depth, no excavations in mines or foundations having yet passed below the line of perpetual congelation. Winter usually sets in about the 1st of October, and may be said to melt into summer, without the intervention of spring, about the 1st of June. The rainy season lasts about two months, July and August. The winds (westerly) are constant and severe during the winter season, but in summer rarely rise to the height of gales below timber-line. On the mountain summits they blow strongly at all times. In July, 1876, the treasurer of the Little Annie Mining Company obtained from the War Department the location of a recording station of the signal service at the summit, and regular observations have been taken during the month of August. The meteorology of the district, about one thousand observations being taken monthly, will be well defined if continued for a year. Lunar halos are frequent, and one very fine lunar rainbow, with secondary, was exhibited on the evening (9 o'clock) of 4th August. Electrical displays are frequent and strong. On the 11th of August the sun, moon, and several stars were visible together a short time before noon. Average thermometer for August, 1876, was 49.2°+; highest reach of the month, 60°+. Prevailing clouds: lower, cumulus and nimbus; upper, cirrus. Winds, mostly WSW.; force average, 1 mile an hour. Total rain-fall, 3.24 inches. Altitude of observations, 11,089 feet.

The first discovery of gold in the summit district was made in Wightman's Gulch about the last of June, 1870, by a party consisting of James L. Wightman, E. Baker, J. Cary French, Sylvester Reese, and William Boran, Wightman getting the first "prospect." All of the party, with the exception of Wightman and Reese, left by the middle of September, the latter remaining, engaged at sluicing, until the 9th November, when they left, heavily packed, and made their way out through snow waist-deep, reaching the Rio Grande in three days.

In the spring of 1871 a large number of people flocked into the summit, hundreds arriving while the snow was yet very deep and work impracticable. A general disgust soon took possession of the prospectors, and by the last of August there were but three men in the district, J. L. Wightman, P. J. Peterson, and J. P. Johnson. These then remained until about the 20th of October, Wightman and Peterson being the last to leave. They took the gold realized by sluicing to Denver, and had it refined at the mint, dividing \$170 between the three after paying all expenses of the season's operations; not a very encouraging yield for

a hard summer's work. Several lodes had in the mean time been found, or at least lead-locations made. The specimens found in the gulch indicated to the miners that they had not washed far, and they believed that parent ledges in place were close by.

In 1872 a few locations were made, and 1873 witnessed a new emigration into the district, and in that year the richest mines in the summit were located. The Esmond and Summit lodes were staked during the summer, and on September 13 F. H. Brandt and P. J. Peterson located the Little Annie, Del Norte, and Margaretta Mines, the former being named after a daughter of Mr. Peterson, the latter after a sister-in-law of Mr. Brandt.

During 1874 a vast number of new locations were made, and the attention of the owners was turned to the matter of getting in machinery. Dr. Richard F. Adams, after locating the Summit Mine, shipped a small amount of the ore to be tested, and, having become satisfied that the enterprise would pay, located a mill-site and ordered a mill which was brought in and commenced to run the following spring.

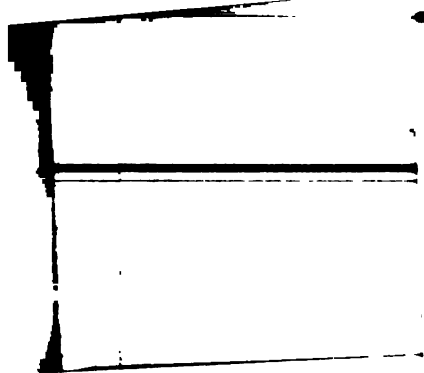
During the winter of 1874-'75 negotiations were opened by the mine owners with capitalists for the purpose of getting in mills. The owners of the Little Annie, Del Norte, and Margaretta, of the Golden Queen, and of the Golden Star, entered into contracts by which the parties putting in the mills were to have an interest in the mines.

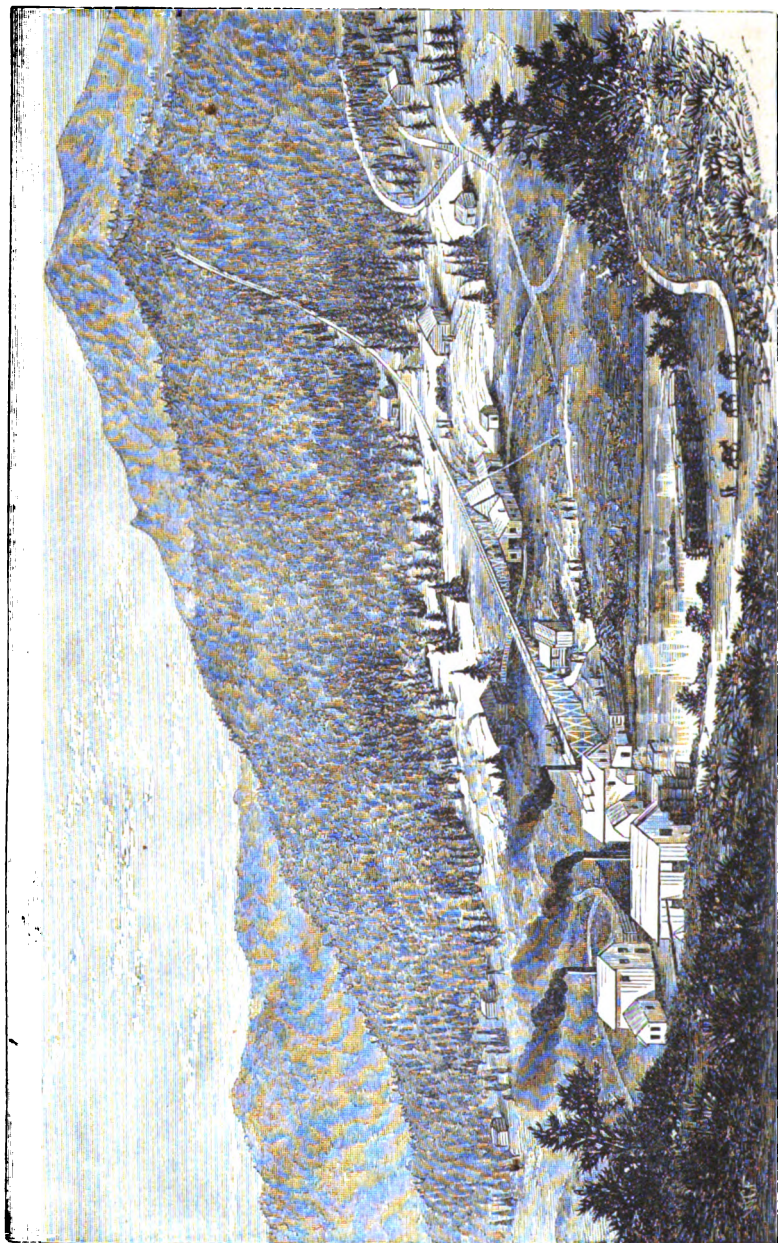
The spring of 1875 marked the opening of permanent mining-operations at the Summit. Dr. Adams's 5-stamp mill began work as early as the advance of the season permitted. In the latter part of May the machinery for the Little Annie and Golden Queen mills reached Del Norte from Chicago, and was drawn by mule-teams on a road cut for the purpose over Del Norte Mountain, 13,000 feet high, and costing over \$4,000. The machinery for the two mills weighed more than 50 tons, but was successfully transported above the lower cloud-belt, and placed in position before the close of September. Such other historical matters as properly belong to this sketch will be found under notices of mining companies, mills, or mines.

The chief gold-producing property of Summit district, and of the territory known as the San Juan mining-region, is owned by the Little Annie Mining Company, and comprises the Little Annie, Del Norte, and Margaretta Gold-Mines, and two placer-claims of 20 acres each, situated in the gulch below them, with a 10-stamp mill, business and assay office, store, bunk-house, mess-house, retort-house, charcoal-house, blacksmith shop, tram-way, substantial mine and mill dumps, dam, flumes, sluices, &c., including all the items to be found in the plant of a first-class gold mining company.

The ores of the Del Norte and Margaretta Mines have not yet been tested in the mill. Average assay-value of former, \$43.37; of latter \$24.20. The Del Norte has yielded exceedingly rich pan-prospects, and on the 26th of August, 1876, a very rich deposit of flour-gold was found on the Margaretta, the extent of which has not been determined.

The chief interest of the district centers in the Little Annie Mine. This lies on the northern slope of South Mountain, the location, for which a United States patent is now sought, being an irregular parallelogram 50 feet wide in its narrowest part, and 1,500 feet long, with general course north $15^{\circ} 15''$ east and south $15^{\circ} 15''$ west. About 60 feet of its superficial length is below and 900 feet above timber-line. The present opening is 500 feet from its lower end, and 11,920 feet above the sea. The Little Annie has had more development than any mine in the district, some 1,200 tons of ore having been taken out, but it is yet only an open quarry. The rock is a light quartz, with more or less re-





SOUTH MOUNTAIN AND LITTLE ANNIE MINING CAMP, SUMMIT DISTRICT, COLORADO.

dish and purplish stain, derived chiefly from iron, non-pyritous, weighing about 60 pounds per cubic foot, or $33\frac{1}{3}$ cubic feet to the ton. Specimens have assayed all the way from \$70 to \$160,000 per ton at the Denver mint and elsewhere. Two to ten men have been employed in getting out ore during the present season, at an average of 4 tons per day of ten hours to a man; average cost, \$1 per ton. Black powder only is used in blasting; cost, \$4.50 per keg of 25 pounds. The present cut on the mine is about 75 feet in length, open, and 35 deep from highest point of surface. Average breadth of cut, 30 feet. It is 887 feet in vertical height above the battery-floor of the mill. Hand-drilling used exclusively. The rock is eminently a free-milling ore, no sulphides or other minerals in combination having yet appeared. Wages in mine, \$2 to \$3 per day and board. No water obstructs working. The average value of the ore is best shown by the result of last autumn's mill-work, in which 306 tons taken from the face of the mine, without any sorting, yielded \$31,444 = \$102.68 per ton, (currency.) The gold is chiefly in the form of "flour," and for the most part invisible, although fine specimens are occasionally taken, some being of very large size. The fineness of the retorts has been about 980, as shown by certificates from the mint at Denver, and from the United States assay-office at New York.

The ore is delivered from the mine to the mill by a tram-way 2,125 feet long, running down the mountain-side and connecting the two. It was built in the spring of 1876, while there was 6 feet of snow on the ground, and is working constantly and satisfactorily, with a capacity of delivery of 80 tons per day of ten hours. Its operation is automatic, the loaded car pulling up the empty one, controlled by a break at the mouth of the mine. It is furnished with a $\frac{7}{8}$ -inch steel cable, manufactured by J. A. Roebling's Sons, which passes along the track over wooden rollers. The cars have a capacity of $72\frac{3}{4}$ cubic feet, or 4,580 pounds. Before the construction of the tram-way the rock was hauled (last fall) from the mine to the mill by teams, and last spring was brought down over the snow in sleds and raw-hides, the former mode costing \$3 and the latter \$5 per ton. Two hundred and sixteen tons and four hundred and twenty-eight pounds were brought down in the manner last named, a stout man bringing down a ton to a ton and a half per day. The cost of delivery by tram-way is about 25 cents per ton, the difference being an important offset against its cost, which was about \$6,000.

The Little Annie Mill is a 10-stamp outfit, with Blake Crusher; capacity of latter, 30 tons per day of 10 hours. The mill has two batteries of five stamps each, four dolly-tubs, or pans, and one agitator. Amalgamation in batteries, on table-plates, in pans, and on a second set of table-plates on a floor below, over which the slimes pass before going into the discharge-slucice. Fall of stamps, 11 inches. Drop rate, 60. Weight, 530 pounds. Cams, two-armed. Shoes and dies of white iron—weight of former 112 pounds, of latter 84 pounds. Length of cams from point to point, 29 inches. Battery-issue, 10 inches deep. Screens, No. 1 fine, slot. Pan-revolution, 65 per minute; settler, 28 per minute. Engine, 25 horse-power, burning 16 cubic feet of wood per hour. Blankets washed every fifteen minutes. Wood delivered, cut and piled, at \$3 per cord; 1,000 cords now under contract, and more than half furnished, at that price. Steam-pressure in boiler, 50 to 55 pounds. Main mill building 32 feet by 42 feet; all 28 feet by 24 feet; substantially built of frame, the main building two stories, with sharp pitched roof and deep loft; siding, a double thickness of boards with tarred paper between; roof sheathed, then a layer of tarred paper, and then shingles. Large water-tank in loft. Power steam, and fuel wood exclusively; water furnished by Wightman's Fork of the Alamosa, on the south bank of which the

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structure stands. Frame of mill raised 10th August, 1875. Commenced to run 28th September following, and has been in continuous operation since, except from 8th December, 1875, to 20th May, 1876, during which time there was no ore on hand. Capacity per day of 24 hours, 5.53 tons of ore, or 1,100 pounds per stamp. Running time in 1876, from 20th May to 1st September, (the date of this report,) gross, 103 days; stoppages of all kinds, 470 hours 17½ minutes; net running time, 2,001 hours 42½ minutes = 83 days 9 hours 42½ minutes, during which time the mill has produced 1,710 $\frac{125}{1000}$ ounces of gold, worth, in coin, \$34,202.50.

The property is favorably situated in regard to fuel. The four square miles immediately surrounding the Annie camp contain over 1,000 acres of heavy, close-standing timber, which will cut 60 to 80 cords per acre. The operations of the mill are constantly checked by assays, the apparatus for which is ample and of the best class, costing about \$900. The average of blanket-tailings to date has been \$87.61; of sluice, \$32.28. Arrangements are now in progress to save a portion of the waste represented by the latter figure. Wear of shoes and dies per month is \$133.33. The following are the elements of mill-work for 24 hours:

Wages of amalgamator	\$3 33
Wages of two engineers	4 50
Wages of one man at crusher	1 33
Wages of two battery-feeders	4 00
Wages of two blanket-washers	4 00
Wages of one wood-passer	1 33
Board of above at \$1	9 00

Total mill-wages	27 49
Fuel, 3 cords, at \$3	9 00
Mercury	50
Oils and tallow	50
Cyanide of potassium	25
Lights	35
Incidentals	50

Cost of running mill 24 hours	38 59
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Cost of mining ore, with six men employed at mine, at, say, \$2.75 each	16 50
Board of same	6 00
Powder, tools, and repair of same	2 50

Average cost of mining	25 00
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(This is, of course, only during the season of active operations at the mine, say five months in the year, at present.)

Other expenses:

Wear and tear of tram-way	\$1 50
Wear and tear and replacement of mill and machinery	6 00
Wear and tear, depreciation, repairs and betterments of buildings of company other than mill and tram-way, dam, sluices, &c.	2 50
Salaries	11 28
Office-expenses	20
General expenses	50
Blacksmith, charcoal, &c	2 00
	23 98

To this may be added interest at 10 per cent. on cost of the company's permanent improvement, say	15 00
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RECAPITULATION.

Mining	\$25 00
Milling	38 59
All other out-go	23 98

Total outlay in 24 hours during the season of out-door work, (say five months,) excluding interest on permanent improvements	87 57
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Adding to this cost of preparing meals, and all other miscellaneous outlays not heretofore itemized, the cost of running the company for one day, from 1st May to 1st October, may be set down at \$95. During the balance of the year, while the production is the same, the expenses are on a greatly-reduced scale.

The cost of board for the hands is 94 cents 6 mills per day, or 31½ cents per meal.

The Little Annie Mill has at present but 10 stamps, but there are 64 stamps working under contract on Annie ore at a cost to the company of \$10 per ton. This reduces very largely on the balance-sheet the ratio of cost to yield. With 10 stamps, it costs the Little Annie Mill \$12.30 to reduce a ton of ore; with 30 stamps, it is profitably done for \$7. The needed increase of mill-capacity will soon be made. Under the above showing, the Little Annie Company's expenses on *its own* work and plant are \$34,675 per annum, charging the maximum outlay (that during the summer months) to every day in the year. The product in its own mill (at the average so far made of \$3,000 per week) is \$156,000 per annum, or a *net* earning of 10 per cent. on \$1,213,250. Three-sixteenths of the Little Annie, Del Norte, and Margaretta Mines and the two placers were sold in 1875, before the mill began to run, for \$78,000.

The placers have been worked only at intervals, without system and without machinery. In this mode they have yielded some very fine nuggets, and have about returned the expense put on them. Copper is found widely diffused in Wightman's Gulch, also platinum in small acicular bodies.

The Little Annie Company is an unorganized association, the members of which are F. H. Brandt, Johnston Livingston, P. J. Peterson, John J. Croke, Lucius A. Winchester, Le Grande Dodge, Henry S. Hoyt, jr., Lewis Croke, Eliza S. Winchester, and Frank W. Winchester.

Its managers are Pear J. Peterson, superintendent, and Charles E. Robins, treasurer. The office of the company is at the mine, Summit, Rio Grande County, Colorado.

The following is its balance-sheet for September 1, 1876:

Debit accounts.

Little Annie Mill.....	\$34,557 42
Machinery-road.....	2,095 13
Cash on hand in office.....	12 00
Gold on hand, 105.25 ounces.....	2,105 00
Cash in bank of San Juan, Del Norte.....	13,429 35
Gold in transitu, 252 ounces.....	5,040 00
Notes receivable.....	953 87
Debts receivable.....	2,662 37
Merchandise.....	3,357 73
Miscellaneous property, tools, &c.....	2,556 96
Office and store building.....	971 99
Furniture in same.....	292 66
Patent-expenses.....	1,317 25
Legal expenses.....	359 69
Office-expenses.....	46 76
General expenses.....	2,825 17
Mill-expenses.....	904 30
Mill-wages.....	1,026 90
Mine-wages.....	873 13
Other wages.....	2,964 41
Salaries.....	2,395 22
Assay-outfit.....	740 09
Tunnel-site.....	69 25
Placers.....	123 35

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Surveys	1,084 07
Charcoal-house	46 00
Outbuildings	153 10
Retort-house	40 43
Cook-house	71 49
Bunk-house	228 00
Golden Queen Mining Company	878 88
San Juan Consolidated Mining Company	1,000 00
Ore, 1875	1,890 00
Rawhide ore, 1876	1,143 15
Wood, 1875	2,418 13
Wood, 1876	611 45
Charcoal on hand	389 20
Lumber on hand	1,184 26
Tram-way, payments on account	2,787 44
Tram-way expenses	15 00
Dividend No. 1	3,480 02
	99,100 62

Credit accounts.

Loss and gain	\$34,374 17
Bills payable	37 00
Assessments	1,485 00
Tram-way earnings	33 00
Retorts, (gold taken from mill,) 3,113.87 ounces	62,277 34
Exchange	894 11
	99,100 62

The Golden Queen Mine was located in the latter part of September, 1873, by Josiah Mann, O. P. Posey, John Grant, and others. It has been extensively worked, and a stamp-mill has been erected 88 feet east of the Little Annie Mill, which is a duplicate of the latter, except that the engine is 20 horse-power instead of 25. Assays of ore in mine have not hitherto run high, and definite information as to mill-results is not at present accessible. The owners are Johnston Livingston, John J. Croke, Adams & Posey, Arthur Burton, Peter Beeker, Joseph S. Reef, John A. McDonald, Lucius A. Winchester, J. S. Partridge, Lewis Croke, William Beck, James L. Hill, Henry B. Clark, F. C. Day, L. O. Smith, R. C. Sheppard, and L. O. Baker. Office, Summit, Rio Grande County, Colorado.

The Summit Mine was located in 1873, by Dr. Richard F. Adams, and his 5-stamp mill, erected in the autumn of 1874, was the pioneer of all the machinery now in the district. The mine lies high up on the northeastern face of South Mountain, and a considerable of surface-ore has been taken from it. Various assays have ranged from \$10 to \$200. Yield in mill not ascertained. Fifteen more stamps designed for the latter are at Del Norte. The power is water, supplemented by a steam-engine. The owners are R. F. Adams, Lewis Croke, and Le Grande Dodge.

The Golden Star Gold and Silver Mining Company owns three mines, all located by Isaac Garnett; the Golden Star No. 2, staked 19th June, 1874; Eighth Wonder, staked 22d June, 1874; and the Keystone, staked 3d July, 1874. Assays have been had from the former of \$20. A superior mill has been erected by the company on Wightman's Fork, with ten 650-pound stamps, and provision for ten more. The building is 32 by 48 feet, with addition for boiler of 15 by 30 feet, substantially constructed with double-board siding inclosing a layer of tarred paper; felt roof. Large Blake crusher; engine, double cylinder and 40 horse-power; single-armed cams. Large grinding-pan, with capacity of eight tons of tailings daily. Drop rate, 90; high mortars; single discharge, (as are all the mills in this district;) width of issue, 12 inches; amalga-

mation in battery and on table-plates; no blankets. Bumping-table on Rittinger plan for concentration; one Wheeler & Randall pan for working concentrates, with raised patent washers; screens, No. 1 fine, slot. Machinery by Morey & Sperry, of New York. Capital stock, \$1,000,000. Principal office, Chicago, Ill.; branch office, New York. Daniel Barnum, president; C. R. Brooke, secretary; J. A. Sperry, builder and agent. Majority of stock held in New York. The mill has just commenced to run; results of work not ascertained.

The San Juan Consolidated Mining Company is a combination owning over 15,000 linear feet on South Mountain, comprising a large number of locations, of which the Ida, staked out by Colonel Gillette, in July, 1874, is at present regarded as the best. A 30-stamp mill has just been erected, and has commenced running. Weight of stamps, 500 pounds; fall, 12 inches; rate, 37 per minute. Double-armed cams; issue, 13 inches wide. Engine, 45 horse-power; steam-pressure, 50 pounds. Amalgamation in battery and on table-plates. Blankets washed every 15 minutes. Four Bartola pans, rate of revolution 35 per minute; one settler, rate 35; screens, No. 1 fine, slot; Dodge crusher, large size. Mill-building, 50 feet square. Capital stock, \$3,000,000. Charles W. Tankersley, president; Thomas M. Bowen, secretary. Office of the company, Del Norte, Rio Grande County, Colorado.

Cropsey's Mill was erected by Col. A. J. Cropsey during the present season, to commence operations in the early part of July, 1877. The structure is 32 by 60 feet, substantially built of logs. It has four batteries, of six stamps each. Weight of stamps, 500 pounds; fall, 15 inches; drop-rate, 30 per minute; capacity, twenty tons daily. Water supplied to batteries and pans by a large-sized Knowles steam-pump. Engine, 25 horse-power. The four silvered table-plates have an aggregate surface of 160 square feet. Blanket-tailings run through Bartolo pans. The mill was built for custom-work, and has up to this time been engaged in sampling the ores of various mines.

The foregoing comprises the main points of the developments in the district. Other mines of more or less prominence are the Chicago, located in 1874; present owners, John B. Hoffy, W. W. Park, and J. W. Harris; the Dexter, located October, 1873, by Josiah Mann, Arthur Burton, and John A. McDonald; the Golden Eagle, located May, 1875, by Jos. S. Reef, Josiah Mann, and Peter Beeker; the Highland Mary, located July, 1875, by Josiah Mann, P. Beeker, J. S. Reef, and A. J. Sparks; the Missionary, located by Benjamin Burroughs, June 18, 1874; the Yellow Jacket, Rising Sun, Caribou, Little Jessie, Little Nellie, Goldie May, Mountain Queen, Wisconsin, Poorman, Des Moines, Esmond, Ellen, Odin, Centennial, Princess, Aurora, Narrow Gauge, Grey Eagle, Moltke, Tender Foot, Queen Esther, David Fulton, John J. Croke, Captain Charley, Golden Star No. 1, Annie E. Benson, McCormick, Independence, Saint Louis, Amazon, St. Mary's, Washington, Columbia, and Major, from the last of which have been taken the finest specimens of free gold yet yielded by Summit district.

The population of the district is about two hundred. Del Norte, 27 miles distant, to which access is had by a wagon-road built this year, and by a trail down Pinos Creek, is its supply-point. Besides the mills and their out-buildings, there are about fifty cabins in the settlement, built of logs and covered with dirt. Freight to Del Norte varies from $1\frac{1}{2}$ to 10 cents a pound. Wood is the only fuel. Cost of lumber, \$30 per M; potatoes, 1 to 8 cents per pound; flour, \$8.75 per hundred; tea, \$1.25 to \$1.50 per pound; beef, $7\frac{1}{2}$ cents per pound; bacon, $22\frac{1}{2}$ cents per pound; sugar, 18 to 20 cents per pound; onions, $12\frac{1}{2}$ cents per pound; dried ap-

ples, dried peaches, and dried currants, 20 cents per pound ; rice, 20 cents per pound ; crackers, 20 cents per pound ; cheese, 30 cents per pound ; kerosene, \$1 per gallon. All supplies must be laid in before winter opens. No raising of vegetables has yet been attempted in the district, though it is possible that a very few of the hardier kinds might succeed. There have been so far only two deaths, one from a blast and one from debility—an invalid. Water boils at 182°.

The two accompanying sketches show, one the mountain and camp as seen from the northwest, the other the net-work of locations covering a portion of the northern and eastern face of South Mountain. Although twenty-three hundred claims have been recorded within its limits, the district so far has been orderly and peaceable. The sketch of the mountain and camp is by Henry Learned, associate of the Chicago Academy of Design, and the mine-map by J. F. Sanders, United States deputy mineral surveyor. There are at present 89 stamps in the Summit and one arrastra. Two more mills are under contract. With the reduction appliances now on the spot or coming, the rank of the district as a gold-producing territory will soon be definitely established.

CHAPTER VIII.

WYOMING AND DAKOTA.

From the Territory of Wyoming I have little to report. The Sweet-water region seems to be nearly idle, and discoveries reported in other parts of the Territory have not yet attained the rank of regularly-productive districts, though I hear vaguely of some mines not far from Laramie which are expected to prove extremely profitable. Doubtless before this report appears in print full information will have been furnished by the press as to rumors which I have, at the moment of writing these lines, no opportunity to investigate.

The production of iron ore for shipment to Utah, which is used as a flux in the lead-smelting furnaces, is still continued; but, although I have not obtained the precise figures, I feel sure that this business is declining or about to decline. The transportation for so many hundred miles of a superb, pure red hematite, only to throw away in mattes, slags, and salamanders the iron it contains, is a lamentable waste; and if the discovery and use by the Utah metallurgists of ferruginous fluxes nearer home should result in stopping the shipments of the Rawlings ore, and in leading its owners or others to utilize it in the manufacture of iron and steel, both the country and the individual would be gainers by the exchange. The ore in question could, I think, without doubt, be used in the open-hearth steel-manufacture by the pig-and-ore modification of the Martin process. The only difficulty in the way of utilizing it in the blast-furnace for the manufacture of pig-iron is that of obtaining a suitable fuel. For the present, the coke of Southern Colorado, or charcoal from the Rocky Mountains, seem to be the only available fuel for this purpose. But reverberatories, Chenot or Blair retorts, &c., can be run with Wyoming coal, using the Siemens producer and regenerators if necessary; and hence there will be a chance, whenever the price of iron advances, to start some form of "direct manufacture," or of the fabrication of steel.

The coal-mining industry of the year is shown in the following figures, for which I am indebted to Mr. I. W. Sannett, auditor of the Union Pacific Railroad Company, at Omaha.

Product of the mines of the Union Pacific Railroad Company.

	Tons.
Carbon.....	61, 751
Rock Springs.....	104, 667
Almy, near Evanston.....	42, 156

Product of other mines, shipped by railroad.

Excelsior Company, Rock Springs.....	6, 366
Rocky Mountain Company, Almy.....	83, 917
Coalville mines, near Echo.....	28, 197

Total product.....	327, 054
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I believe these are tons of 2,000 pounds.

THE BLACK HILLS.

Mr. Walter P. Jenney, under the direction of the Commissioner of Indian Affairs, has made, during 1875, a careful exploration of the Black Hills of Dakota, and his forthcoming report will doubtless contain a clear and discriminating account of their mineral resources, so far as these can be determined by a general reconnaissance. In the present instance I expect that Mr. Jenney's report will approximately fix the extent and nature of the gold-bearing drift, upon which the placer and hydraulic industry will depend. Of course he could not explore the quartz-veins, nor prophesy whether or not rich mines of that character would be opened there. It is evident that a considerable immigration will pour into that region as soon as the Indian title, or the Indian opposition, is extinguished. Not improbably there will be some excitement; certainly there will be sanguine reports from miners and speculators. But I hazard little in expressing the opinion that the placer and gravel deposits, though they may suffice to open the country to other industries, will not sustain for any considerable period a large and profitable production of gold. A few localities of limited extent will perhaps prove rich, but there is apparently no chance of finding such wide and deep auriferous drift as the western flank of the Sierra Nevada presents.

CHAPTER IX.

NEW MEXICO.

For notes of the mining-industry in this Territory I am chiefly indebted this year to Mr. Theodore F. Van Wagenen, of Colorado, who, as my agent, collected such data as were available with the means at command. According to his reports and estimates, the coin-value of the bullion-product of New Mexico in 1875 was as follows:

Silver bullion.....	\$225, 000
Gold-dust	95, 000
Gold and silver in ores shipped out of the Territory for reduction.....	5, 000
Total precious metals.....	325, 000
Estimated value of copper in copper-ores and of a small quantity of pig-lead	74, 915
Total metallic products.....	399, 915

The small progress of mining in this Territory is due to its remote position and imperfect communication; the indolence or indifference of the Mexicans and half-breeds, constituting the larger part of its population; the great scarcity of water, which, in many localities, forbids placer-mining, and in others enhances the cost of milling quartz; and, finally, the failure to obtain, in many of the mountainous districts, adequate supplies of ore suitable for the simple processes of reduction upon which reliance must be placed in the early stages of development. There is a large area of auriferous alluvium in the Territory; its resources in copper are remarkably extensive; large veins of galena characterize several of the mining-districts; and the supply of coal is both abundant and excellent. As yet, however, no quartz-mines, whether of gold or silver, have been successfully worked for long periods since the days when Maxwell's ranch and the Ortiz Mine grant were under active development. The recently-developed silver-districts contain many deposits of the character of pockets or chambers and much base metal, and the lack of water in most of them increased the cost of operations. Yet it would be unjust to deduce from these results of experience thus far a general conclusion unfavorable to the resources of the Territory. The very predominance of base metals, for instance, which now constitutes a hinderance to rapid development, will become in time an element of prosperity; while, on the other hand, the small amount of successful quartz-mining is to be considered in connection with the small amount of energetic prospecting and of invested capital. These views are illustrated by the details given below.

GRANT COUNTY.

The mines of this county yielded last year about \$225,000 in silver and \$25,000 in gold. Mining is now carried on in five districts in the

county, viz, Pinos Altos, Georgetown, Lone Mountain, Silver Flat, and Chloride Flat.

Pinos Altos district produces gold exclusively. The country-rock is syenite and gneiss, and the deposits have generally the character of gash-veins; but a few are apparently true fissures. The principal veins are the Pacific, Pacific No. 2, Arizona Central, and Atlantic. None of the mines are deeper than 150 feet. The surface-ores assay from \$8 to \$25 per ton, and consist of a honey-combed quartz in which the gold is comparatively free. Beneath the zone of decomposition the veins carry pyrites worth about \$10 per ton in gold and silver. As yet this class of mineral has not been successfully worked, and hence only surface-ores have been extracted. In the gulch are two steam-arrastra mills, one having eight machines and the other four. The district contains about a dozen other arrastras, driven by horse-power. They save from 60 to 70 per cent. of the assay-value of the quartz. During last season a number of Mexicans extracted from the gulch-diggings a small amount of gold.

Georgetown district is at present by far the most promising in Grant County. The country-rock is limestone, and the mines, excepting the Pi-Ute and Naiad Queen, are contact-deposits occurring between limestone and slate. The Pi-Ute and Naiad Queen are on the same lode, which appears to be a contact-vein, having granite for its hanging-wall. The ores of the district have a siliceous limestone gangue, and consist of carbonates of lead, galena, antimonial silver, silver chloride, and native silver. The miners separate their ores into two grades, milling and smelting ore. The separation is effected mainly by washing, by which the finer and poorer material is washed away from the larger and heavier. The former constitutes the milling-ore, and averages about \$125 per ton. The latter is smelted into "lead bullion," and averages, as delivered to the furnaces, from \$500 to \$1,500 per ton. The camp contains two Mexican furnaces, each capable of treating one ton in 24 hours. A stamp-mill is being erected to crush and concentrate.

The two principal mines, aside from the Pi-Ute and Naiad Queen, are the Commercial and McGregor, each of which is between 30 and 40 feet deep. About a dozen more complete the list. Work has been quite continuous in this district during the year.

Lone Mountain district has not prospered greatly during the year. The veins are narrow and poor, and fill the limestone rock like a network. A large amount of work, therefore, produces only a small amount of ore. When the district was first opened several rich pockets were found, which caused considerable excitement, but in 1875 the developments were meager. The silver-ore is a mixture of chlorides and sulphides, carries very little lead and not much gold. The principal mines worked during the year were the Durango, Emma, Copper Point, Home Ticket, and Red Lode. They have attained a depth of 30 to 50 feet, and have been producing with more or less regularity during the year. The reducing facilities of the camp consist of two steam-mills of 30 tons capacity each. The system employed is the Washoe raw amalgamation.

Silver Flat and Chloride Flat are in the immediate vicinity of Silver City. In the former most of the mines are idle, the ore being of so low grade as to offer no inducements for working at present.

The New Issue and the Legal Tender are the best mines of the district. Chloride Flat has produced a considerable amount of ore during 1875. The deposits are in limestone, and occur with some regularity, though presenting no proofs of permanence. Most of them lie horizontal, expanding at times into large bodies or chambers, and again narrowing

to seams quite difficult to trace. The ores are similar to those of Georgetown, containing sometimes, however, a little copper. The gangue is calc-spar.

The Providence, which in 1873 was one of the best mines of the district, has been idle for two years. It is 75 feet deep.

The Two Ikes is worked only by Mexicans. It has produced a small quantity of ore during the year. This was formerly a productive and profitable mine.

The Texas, which has the reputation of being the best mine in New Mexico at present, was worked steadily during most of the year; and the Seventy-Six, on the same vein, has also been tolerably productive.

The Seneca has been idle for four years. The Dexter has yielded nothing for the last six months, but is still prospected.

There are three mills at Silver City—the Tennessee, Bennett's, and the Wisconsin. Their combined capacity is about 15 tons in twenty-four hours, and they have been running with considerable regularity during the year. The Wisconsin amalgamates raw, the other two roast. The Tennessee Mill is supplied with ten stamps, two Brückner cylinders, and six pans. The Bennett Mill carries ten stamps, six triple-hearth reverberatory roasting-furnaces, four 4-foot Varney pans, two 6-foot Wheeler pans, and five 3-ton tanks for leaching. The Wisconsin Mill uses a Bolthoff pulverizer.

What are known as smelting-ores in this district are the richer grades carrying usually 300 ounces of silver and upwards per ton. They generally contain a little lead, and there is just enough galena in the district to permit (with careful repeated use of the litharge from cupellation) a limited amount of lead-smelting in a blast-furnace. The furnaces used are built of adobe, and are 8 feet high from the bottom of the crucible. They will stand about four days' heat, after which they must be relined. Sometimes a species of refractory sandstone is used instead, of the adobe, which will last for nearly two weeks. One tuyere is used, and the blast is supplied by a common bellows, worked by hand. The fuel is oak or pine charcoal, the former being preferred. The Mexicans make their charge about as follows: one-third ore, one-third old slag, and one-third litharge. This is thoroughly mixed, and fed in by the bucketful alternately with the coal. The cupels are made of adobe lined with loam and ashes.

Santa Rita district.—The Santa Rita Copper-Mine has not done remarkably well during the year. Considerable capital has been expended in building furnaces that have not been run, and in exploring parts of the mine that did not pay. A new surface-body of ore was found during the year, from which most of the ore shipped was taken.

The Chino Mine, in the vicinity, has been worked steadily and with favorable results. It produces mainly the carbonates of copper. The mine has two shafts 150 feet apart, 65 feet deep, and connected by two levels, which show throughout, as is reported, a vein from 2 to 7 feet wide of green carbonate, black oxide, and red oxide of copper. The country is decomposed granite, and requires timbering in drifts and shafts. According to a recent account, Mr. Magruder, the owner, is now sinking in the main shaft, on a vein of 10 to 12 inches, native copper and red oxide, containing 80 to 90 per cent. of copper. This vein is in water, which is raised with a whim. South of the southern or main shaft a drift shows 3 feet, of 30 per cent. carbonate. North of the north shaft a drift, now 75 feet long, shows for part of the distance 7 feet, and for the larger part 3 feet, of black oxide and carbonate.

The San José has been idle for two years. Plenty of ore is in sight,

but it is mostly copper sulphide, and too refractory to be treated with the rude appliances used for the oxidized ores.

The Yosemite is one of the promising new copper-mines of the district. It lies about 600 yards south of the Chino, and belongs to the same person. The two shafts have reached 48 and 95 feet, respectively. From the latter a drift 120 feet long, and still vigorously driven, shows a reported average of 3 feet red oxide; from the former a drift northward is said to have an average vein of 2 feet excellent ore.

The Burro Mountains, about 12 miles from Silver City, have been prospected somewhat during the year. A number of the gulches are rich in gold, but there is no water to wash with. Numerous silver-bearing veins have been found, but they are as a rule of low grade. Some very promising deposits of copper discovered in these mountains are not being worked.

Ralston district, 60 miles west of Silver City, has been the scene of some excitement during the year. The veins here are in granite, are large and strong, and carry silver, gold, and copper. They are, however, quite low in grade, not averaging over 25 ounces of silver per ton. There is no supply of wood within 10 miles, and no water (except from wells) within 50 miles.

Socorra district.—The Socorra mines show but little progress during the year. The district is mainly noted at present for its deposits of fire-clay, though there are a number of large galena-veins, carrying from 10 to 15 ounces of silver, some copper-deposits, and some lodes rich in gold-ore.

In *Ute Creek* and *Moreno* the mines have been worked during the year with some diligence. At one time in the summer the production of dust was averaging \$10,000 per week; but this yield was not maintained for any great length of time. The total product of the district, Mr. Van Wagenen estimates to have been between \$50,000 and \$60,000. There is a good water-supply and no lack of rich soil. Some new capital has lately come into the district, and it is quite likely that next year will witness a great advance in the industry. Grouse, Michigan, and Humbug Gulches and the Moreno were the localities worked most extensively during 1875.

NORTHERN AND MIDDLE NEW MEXICO.

There is nothing to report from this part of the Territory. The Maxwell, Old Placer, New Placer, Cerrillos, and other grants containing mineral deposits of value have been little worked by their owners, and the scattered results of Mexican labor in the gulches are not ascertainable, and not important. Perhaps some gold from these sources, finding its way to the more active business centers of San Juan, is included in the reports elsewhere given concerning the product of that part of Colorado.

CHAPTER X.

ARIZONA.

For the preparation of this chapter I am chiefly indebted to Hon R. C. McCormick, than whom no better authority can be named. Mr. McCormick desires to acknowledge receipt of information from Governor Safford, John Wasson, esq., of the Arizona Citizen, T. J. Butler, esq., of the Arizona Miner, and W. J. Berry, esq., of the Arizona Sentinel.

After many years of tedious and costly conflict, the Apaches and other hostile Indians occupying this Territory have been forced upon reservations, and so long as Congress furnishes the money for supplying them with food, they will not interfere with mining operations, which heretofore they have at many points impeded and at others absolutely prohibited.

Mine-owners are naturally elated and hopeful under this new and long-wished-for condition of affairs, and prospectors are daily making fresh discoveries of gold, silver, and copper lodes, many of them of exceeding promise.

But the peaceful condition of the country, with all its attendant advantages, and the value of many of the mines, (which is no longer a question of doubt,) are not sufficient to overcome the need of cheap and quick transportation, which, next to the Indian troubles, has ever been the serious drawback to the rapid settlement and profitable development of this remote Territory.

The past year has witnessed an increased attention to mining and the investment of some new capital, but the distances, both from the Pacific and the Atlantic States, are such, and many of the roads to the mineral districts are so heavy or rough, that no expeditious and economical movement of ores, machinery, or miners, no working or shipment of low-grade ores, and no influx of capital (even from California) can be looked for, and consequently no extensive or very important operations can be carried on until at least a trunk railroad crosses the Territory.

At present only such gold and silver lodes as would elsewhere be considered surprisingly rich can be worked to advantage, and scores of lodes that would pay handsomely in California or Colorado are utterly neglected, while the great copper interests of the Territory (for copper is nowhere more abundant or of greater purity) are for all practical purposes without value.

Fortunately, if Congress refuses to aid in the construction of a railroad by the thirty-second or thirty-fifth parallel, or by both, private enterprise will soon supply the great desideratum.

The announcement is made that the Southern Pacific Railroad of California, now extending to Dos Palmas, on the desert, between San Bernardino and the great Colorado River, will be completed to Yuma, on that river, early in the year 1877.

This done, as it doubtless will be, it cannot be long before, with or without a subsidy, the same company or the Texas Pacific Company

will connect with the Texas railroads, thus affording Arizona an outlet to East and West, and a trunk-line to which narrow-gauge roads from Prescott and from all the important mining-districts, north and south, will soon become tributary, and thus the solid and lasting prosperity of the Territory will be assured.

The mining-districts in Arizona are now so many in number, that it has been thought best to make reference only to the counties in which the lodes referred to are located, and it must not be understood that all, or nearly all even, of the prominent lodes are herein named. The aim of the writer has been to refer to several representative mines in each county, and particularly to those not mentioned in previous reports; but for this purpose so few owners have furnished material, (in response to urgent appeals through the press and by private communication,) that he cannot claim to have more than partially covered the field.

For some reason or other the miners of Arizona have always been slow to avail themselves of opportunities to make their discoveries and developments known through Government reports, and to this day it is about as difficult to estimate the annual yield of gold and silver in the Territory as it was when the first mining operations were begun, there being as yet no official record kept of the shipments of dust, ore, or bullion either to California or to the East.

PIMA COUNTY.

This was the first settled, and to overland travelers is the best-known part of Arizona, as the route of the Butterfield stage-line (from Saint Louis to San Francisco) was through it, and it was the national highway to the Pacific prior to the civil war. Tucson, the county-seat, and the capital of the Territory since 1867, is the chief town in Southern Arizona, and the largest in the Territory. It was a military post under Mexican rule, and it is supposed to have been founded more than one hundred years since. It is well built, of adobe, and pleasantly situated in the valley of the Santa Cruz. The mines of Pima County were the first open in Arizona, and are yet considered among the best. They are of quartz, but placers have been worked at several points, and recently those at the Santa Rita Mountains have given good returns to quite a large number of prospectors.

The Arizona Citizen of July 3, 1875, has this reference to these new and apparently extensive placers:

Wednesday of this week this town was again surprised at the products of placer-gold in Smith district. David Burroughs brought in from there 94 ounces of nice placer-gold, the product of three days' work of himself alone, and he carried the dirt three-fourths of a mile in a sack on his back to water, where he washed it under unfavorable circumstances. The gold averages coarse. One piece is worth about \$50, another near \$35, and others from \$1 to \$5. His claim is in a gulch making into the main placer-ravine from the Santa Rita Mountain side.

We learn that Horace Arden has regularly made an ounce a day in the Smith district, and that he is not noted for working imprudently hard, but goes along cleverly, making his \$16 to \$20 per day; the gold being worth these figures per ounce.

Since the above was written, Jack Ralston came in from Smith district with \$150 more placer-gold—nuggets we should say. The largest piece is worth just \$90.50, and the balance in bits from \$1 to \$10. This gold was washed, and by packing the dirt a long distance to water. The hills and gulches all about have gold in them, and, with plenty of water, millions could soon be taken out. The gold coming from there brings vividly to mind that seen in every store in the mountains of California from 1849 to 1854. There is no doubt of an immense gold-quartz lead in Smith district, for this placer-gold is evidently not far from its original resting-place.

Southwest of Tucson, in what is known as the Papago country, there are extensive "dry washings," and the Papago Indians have for years

brought more or less of gold-dust to the Tucson merchants. In one month of the present year one firm purchased over \$3,000 worth from them.

Of the quartz-lodes, the Cerro Colorado and the Patagonia are the best known in Pima County. Work upon them was begun before the organization of the Territory, but for years they were virtually abandoned to the Indians. Now, under new owners and better auspices, they promise good returns. Their characteristics having been fully described in previous reports, it is not necessary to repeat them in this connection.

The Old Mine, supposed to be the old Tumacacori, has recently been re-opened and its shafts and tunnels cleaned out. This is one of the numerous mines worked by the Mexicans many years since.

Already, in cleaning out the mine, Mr. Darrah has found two sacks of silver-ore worth at the rate of \$7,000 per ton. He finds the old drill-holes to be 4 inches square, proving that the work was done very many years ago. He also found skeletons in the old works, leading to the belief that the workmen staid by the mine until they were murdered by Indians, and this theory is strengthened by the very rich ore found on the dump, which, in case of abandonment, would very likely have been taken along. The Old Mine is in the Ostrich Mountain range, and is about 75 miles southward from Tucson. Wagons can easily be taken within 2 or 3 miles of the mine. Wood and water are plentiful, and near the works. The natural surroundings are favorable to successful mining, and the owners are confident they have a very valuable property.

The Nequilla Mine is situated 12 miles west of Tucson, in the Amola Mountains. It was discovered in 1865, and has a shaft 120 feet deep, with two short tunnels. On top the vein was 15 inches thick; in the bottom of the shaft it shows 4 feet solid metal with a clean wall, and dips about 45°; mostly amalgamating-ore, which has been worked by the old Mexican process on the patio, and paid over \$60 per ton. The general course of the vein is northeast and southwest. This was the first mine patented in the Territory, (1872.)

A 10-stamp mill has been placed upon the Ostrich Mine, located about 80 miles southwest of Tucson, and the mine will be regularly and systematically worked. Developments on the vein consist of one shaft 60 feet in depth, and a drift or level of 40 feet; another shaft 50 feet deep and drift of 60 feet, and another shaft of 35 feet in depth. In all the workings the vein shows permanent walls, and it is beyond doubt a true fissure-vein. The ore paid a handsome profit by the arrastra process. The company have built a fine road from the adjacent valley to the mine. Water for the use of the mine is obtained about a mile from the mine from a spring, which will furnish more water than will ever be needed at the mine.

A shaft to the depth of 60 feet has been sunk upon the Yellow Jacket lode, and at that depth the vein is well defined and increasing in width and richness.

D. C. Thompson writes that from 5,900 pounds of ore taken out of the Arizona Cloud Mine, and worked in the Ostrich Mill, he obtained a result of \$579; nearly \$200 per ton.

The San Xavier Mine, 18 miles from Tucson, has recently been developed to a considerable extent. The ore is of argentiferous galena and chloride, and a quantity smelted in a Mexican furnace gave fifty per cent. of silver and forty-five of copper.

The Trench Mine, in the Patagonia Mountains, is another of the mines

worked by the Mexicans in years past, and (as it is believed) by the Jesuits in the last century.

At the highest point on the vein a shaft is sunk 110 feet. The metal, a rich carbonate of lead, width from 1 to 7 feet, in smooth clay walls. Three hundred feet west, and about 60 feet lower, another shaft is sunk 30 feet; the vein, 3 feet wide, of bright galena. The vein between these shafts has been uncovered, and shows from 3 to 4 feet wide, 150 feet. Farther west, and 60 feet lower, a tunnel is run in along the vein for 40 feet, showing a vein 30 inches wide, mostly a rich carbonate of lead. Ore from this tunnel has assayed \$378 per ton. Two hundred feet to the west of this tunnel, and 100 feet lower, another tunnel is run in along the vein 75 feet. The vein here is from 12 to 30 inches wide, bright galena, and increases in width regularly as greater depth is attained. Country-rock, granite and porphyry.

In 1874 two furnaces were erected, and about 100 tons of ore reduced in the Mexican way, and produced 87 ounces of silver per ton.

One mile from the mine is a living stream of water sufficient for all purposes in running large works where steam is used for motive power; timber for coal is practically inexhaustible, and the whole country is covered with nutritious grasses.

About twenty men are now at work upon the mine, and building furnaces, burning coal, &c., preparatory to reducing from ten to twenty tons per day.

The Rusk, France, Florencia, Lost, Salero, Serena, Enterprise, San José, and Santa Maria lodes have been worked to some extent and are well spoken of, and some promising silver-lodes have lately been taken up in the Arabaipa Cañon and some near the Sonora line.

Through Pima County there are signs of unusual activity in prospecting and developing lodes, as far as the limited capital of the people will warrant. The country is so level, and the roads are generally so good, that ores and machinery can be moved with less expense than in many parts of the northern counties, but as yet there is but little machinery in use.

The Arizona Citizen (Tucson) thus refers to the situation :

Thus far our miners have worked with little means and without machinery or furnaces, and yet we do not know of a single man who is not pleased with his prospects. It is only a little more than one year since the promised peace with the Indians has been believed permanent, and in that short time enterprises have been undertaken and carried to a point where success is now regarded as certain. Shafts have been sunk, cuts made, and tunnels driven into the mountains revealing bodies of ore that bear a world of riches. And this good work goes bravely on. Nearly every range of mountains is filled with hardy prospectors, turning over the treasure-bearing rocks, bringing to light new veins, and preparing for the day when extensive reduction-works will enable them to receive a good return for their present labors.

Had Congress granted us a railroad, our situation would have been second to none of the mining empires growing up on the Pacific coast. As it is, we must still work on hopefully, sowing that we may reap, knowing that we have in abundance the elements of a golden future, and that the better day so long hoped for is not so far away as many would have us believe.

PINAL COUNTY.

This is a new county created by legislative act, approved February 1, 1875, and constituted of parts of Pima, Maricopa, and Yavapai Counties. The county-seat is located at the town of Florence, upon the south bank of the Gila River, about 90 miles north of Tucson and 200 miles south of Prescott by the stage-road.

The first county officers were elected on the first Monday in March following, and at about the same time the denizens of the new county

were thrown into a state of great excitement by the discovery of what is now known as the Silver King, a huge vein of silver-ore. The story of its discovery, location, and value is thus told:

Four farmers lived near Florence—Regan, Copeland, Mason, and Long—to relieve the monotony of agricultural labors on the Gila, made occasional prospecting visits in the adjoining Pinal Mountains, and had discovered a copper-vein about 40 miles back in the mountains called the Globe Mine. When Tully, Ochoa & Co. started their copper-furnace in Tucson, Regan and his partners concluded they would have their Globe Mine tested, and fitted out at Florence to go after some ore.

A discharged soldier, who happened to be in Florence enjoying the festivities of the election-day aforesaid, came to the Regan party and "held them with his glistening eye." "I have a tale to tell," said he; and then he told them a dead comrade's story. "When you go up the Stoneman grade," said he, "you will pass the tanks; you will pass old Camp Pickett; then, some five miles on, you will come into a mountainous country; you will see a little valley like, hemmed in with mountains; near the head of the valley you will see some immense boulders on the side of the road; off just a little bit you will see a little brown hill rising up all by itself, and in that hill, if what my old comrade said is true, you will find the richest mine in the world."

The Regan party heard the stranger's story, but were not much affected by his recital. They went on with their preparations for the copper expedition, passed up the grade, recognized the valley, saw the boulders and the little brown hill beyond, and laughingly said, "There's our big mine, boys." But not one of the party stopped or appeared anxious to verify the stranger's tale. They had started for copper, and with the dogged persistence and easy incredulity of the old pioneer stock, were not to be turned aside by any tale, no matter how eloquently it might be told. They toiled along up and down the rugged side of the Pinal Mountains until they got to their Globe Copper Mine, dug out what they wanted, loaded their pack animals and returned, and then again they met the little brown hill which the story said contained endless wealth for the fortunate possessor of its contents. Regan, who was the leader of the party, looked at the little brown hill and meditated. It might be as well to look into the matter a little. Having more confidence in Copeland's judgment of mines than his own, he turned to him and said, "Copeland, let's look at this thing; give me the lead-mule, and the rest of us will go on to camp, five miles below, and you go over and see what you think of it." Copeland went over and found croppings immediately. The next day they all went to Florence. Copeland took his rock to a blacksmith's forge and melted out a fine bar of pure silver.

The party had been in great haste to get some copper out from the Globe to test their mine, but it was concluded now that the copper could wait. They procured a wagon, a few mining-tools, and returned next day to the little brown hill, broke off 1,500 pounds of rock from the surface, and took it to Tucson with their copper. The Tucson people admired the ore; so much so, that one of them offered \$800 for the 1,500 pounds, which offer was immediately accepted.

Regan and his party named their discovery the Silver King, and began sinking on it about the 15th of April. There is now a lively little camp near the mine, with a four-horse stage making regular trips to and from Florence, which is 35 miles away.

The Silver King shaft is now down 42 feet, with a drift from the bottom 12 feet. The shaft is 6 by 9 feet, and the drift is 5 feet wide by 6½ feet high. The shaft started on mineral, and as it goes down cuts numerous small seams of rich ore, all pitching toward the main mountain at an angle of about 55°. These seams vary in width from 3 inches to 18 inches. The hill is in a formation of brownish stone, which the miners think is a kind of granite. The vein-matter is quartz. The mineral consists chiefly of chlorides and black sulphurets. Great quantities of nearly-pure silver is found in little black nuggets in the quartz; these nuggets are soft, have coherence like bar-lead, and can be chewed between the teeth without feeling any grit; they assay about \$20,000 to the ton. The first lot of ore worked was about 500 pounds, taken from the first 14 feet of the shaft. It was worked in a little furnace built at Florence by Messrs. Airy & Hughes to work ores from this district. This lot of ore yielded over \$5 a pound, and 100 pounds yielded over \$8 a pound. To work this, they bought in Tucson pig-lead produced from the Patagonia Mine, which is about 80 miles south of Tucson. It is estimated that the ore taken out of the shaft of 42 feet depth,

6 by 9 in size, will, taken as a whole, yield about \$50,000; or, in other words, that the original prospecting shaft on the mine has in the first 42 feet given a yield of over \$1,000 a foot.

The mine produces mainly a milling-ore, but the richest portions may be best reduced by smelting. Many silver nuggets have been found, which only require the application of heat to reduce them to merchantable silver.

The Silver King has been examined by experts from San Francisco, and it is said that a company will soon be formed in that city (where the ore has attracted much attention) to work it upon a scale commensurate with its size and richness. The ore in sight warrants the immediate erection of extensive works.

Numerous extensions have been taken up, and other lodes have been found in the vicinity. Of these, the Josephine, Iron Horse, Democrat, Fernandez, Hub, and Pike are reported to give rich indications.

The Surprise lode is of the same character as the Silver King. Mr. George Richmond writes that in one day 60 pounds of silver nuggets were taken from it.

The Athens lode, discovered by Mr. Dorsey, is well defined and traceable a long distance, running in a northeasterly and southwesterly direction south of the Silver King.

Mr. C. O. Brown, now one of the owners, recently brought to Tucson 80 pounds of silver nuggets which he picked up from the surface of this ledge. The largest piece weighs 34 pounds, and is believed to be worth \$12 per pound, or, in other words, to be nearly pure silver. It has been sent to San Francisco for exhibition.

Northeast of the Silver King about 40 miles, in the *Globe district*, the principal lodes are the Globe, Rescue, Rambo, Alice, Pinal, Champion, and R. C. McCormick. A number of tons of silver-ore, estimated to be worth \$1,000 to \$1,500 per ton, have been sent to San Francisco from the Rescue.

"The lodes," says Governor Safford, "are regular and give promise of permanency."

South of the Gila River about 30 miles, in the *Quacharty district*, the Quacharty and Sacaton silver-lodes have been opened. Shafts have been sunk and large veins of good ore found, incased in regular walls. The ore yields from \$50 to \$200 per ton in silver, and is mixed with lead and copper. Many locations have been made in this district.

MARICOPA COUNTY.

This county, which lies between Pinal and Yavapai Counties, and of which the town of Phoenix is the county-seat, is one of the best agricultural districts in Arizona. The fertile valleys of the Gila and Salt Rivers, which form a junction near to Phoenix, are very extensive, and the abundance of water in said streams at all seasons admits of cheap and ample irrigation.

The northeastern part of the Globe mining-district (referred to under the head of Pinal County) is in this county, and its mountains all give evidence of more or less of mineral wealth.

YAVAPAI COUNTY.

This county includes an important part of central and all of northeastern Arizona. Prescott, the county-seat, and for some years the capital of the Territory, is picturesquely located in the mountains, at

an elevation 6,000 feet above the level of the sea. It is one of the best built and most attractive mining-towns upon the Pacific slope, and with its fine brick and frame houses and stores it resembles a thrifty New England village much more than the average frontier settlement. The climate, which is never oppressive, and the abundant supply of timber and water, combine to make this part of Arizona especially enticing to miners, and the population is almost entirely American.

The best placers were found in this county in 1863. For several years large quantities of gold were taken from Lynx Creek, the Big Bug, the Hassayampa, and other streams; and now, at certain seasons, the washings are found very profitable.

The county is prolific in quartz-lodes, both of gold and silver, but, unfortunately, the mills first brought in some ten years since, at great expense and great risk, owing to the active hostility of the Indians, were, most of them, put upon veins, the ores of which had been tested only by assay, and naturally many mistakes were made and much time, labor, and money were thrown away upon non-paying lodes, of which even the richest mining-districts of the Pacific coast have a large proportion.

Since there has been less haste there has been less waste, and most of the mills now running are located upon good mines, and pay as well as can be expected at the present cost of working ores.

The Peck Mine, located near the Tiger belt, and about 30 miles east of south of Prescott, is the latest sensation in this county.

C. C. Bean, esq., of Prescott, thus describes the discovery of this mine and its character in a letter dated July 8, 1875:

On the evening of the 16th of June, Mr. E. G. Peck discovered, on War Eagle Creek, in the foot-hills, at the base of the Bradshaw Mountains, three large ledges or lodes of quartzite, which carried mineral, and which had probably, been passed over by a thousand prospectors before him, who regarded them as of no account, except so far as iron was concerned. In one of these ledges he found a crevice of 2 feet in width, which disclosed gray sulphide of silver and other mineral beneath the cropping, and some of the ore being brought to Prescott, it has been pronounced by assayers and competent judges to be of the very highest grade of silver-ore, as good as that taken out of the Eberhardt, at White Pine.

The mineral on these ledges has been traced for nearly 4,000 feet, and the indications are that these ledges form one large and valuable mine—at least, on the discovery and first extension claims. I have been on the ground and assisted in clearing the location for the dump and for sinking the shaft, and between two and three tons of ore was obtained in this little work, and that of the highest grade.

I lifted out myself chunks of pure gray sulphide of silver that would weigh from four to ten pounds, and that would yield at least 84 per cent. of silver.

Col. A. V. Kautz, commanding the military department of Arizona, adds this testimony, in a letter dated at Prescott, July 14, 1875:

The lode is on the summit of a spur of the Bradshaw Mountains, running north of east. There are three massive ledges of purplish quartz, parallel, and projecting above the surface, often 20 feet high. The distance between these ledges is about 50 or 60 feet. On the south side of the south ledge, on the hanging-wall, is the point of discovery, where the discoverers are now working and taking out the wonderfully rich ore from a pay-streak about 2 feet wide. We found several tons of this ore already on the dump-pile, and no signs of running out. Of course it is impossible without work for any one to tell how long it will pay, or how much of this very rich ore exists. The parties at work were apprehensive of its being too rich to last. They stated, however, that the same character of ore had been traced at opposite sides of the mountain on the same side of the ledge. While the very rich ore may be limited, I have every evidence that this discovery will lead to the development of extensive and valuable silver-ledges. In all my experience I have never been in a region where the ledges are so well defined and so extensive. From the point where we struck it to the Peck lode, the trail from Black Cañon passes over one ledge after another, the course and width of which can be traced from one mountain to another as far as the eye can reach. These ledges start within 15° of a vertical position, and dip to the north.

We examined another discovery of the parties interested in the Peck lode, called the William Wallace, and found it to be about 100 feet wide, for which it is claimed that

it pays not less than \$40 to the ton wherever it has been tested. The appearance of the lode is on the surface that of iron, and there are veins of native silver found in it. These discoveries are difficult of access, and it will be necessary to pack out the ore on mules until roads are made, which will be expensive. There is not much wood or water in the neighborhood, although there is a fine supply for the use of animals and workmen at the Peck Mine.

Col. H. A. Bigelow, of Prescott, a noted pioneer in Arizona, who lately visited the mine, writes of it as follows:

The shaft on the Peck Mine has developed magnificently. Those who have seen the mine will understand its situation when I say that the shaft was started on the east side of the mine, in the open cut on top of the hill, where the ore sent to Prescott has been taken out. It was sunk at the back end of the cut, which was about 20 feet deep, and is now down 32 feet, and the bottom has reached a fine body of ore 2 feet thick, and they have been taking out rich rock all the week. It is the largest and best deposit of ore yet found on this wonderful mine, and Mr. Hogle says (and his varied experience gives weight to his opinion) that it is the richest average ore he ever saw taken out of the ground. The tunnel is to cut the veins at right angles; is in some 25 feet, and in very hard, blue slate. Another tunnel on the north side of the hill, being run in on the Peck vein, is in 70 feet.

Ten tons of ore selected from the first taken from this mine were sold in Prescott for \$13,000, which the owners considered much below its real value.

The Silver Prince is but half a mile southeast from the Peck, and in the same belt. Several tons of ore that assays up among the thousands have been taken out and shipped; and at seven different openings on the surface, 1,200 feet apart, there is a show of uniformly rich ore. The Silver Prince (singular number) really consists of two parallel veins 120 feet apart, both of which show rich ore where opened.

Colonel Bigelow, before referred to, says of this mine:

At the Silver Prince the principal work going on is the sinking of a shaft, which is now about 50 feet deep. It is on what they call the little ledge, and follows the vein down, taking out all between the walls, which are from 4 to 5½ feet apart, and as smooth as a bar of soap. At the top of the shaft very rich chloride was found, but as they went down the pay-streaks widened from a few inches to more than a foot, the ore changing to fine milling-ore, good enough, but not sufficiently rich to bear transportation at present rates.

* * * The present cost of getting ore to San Francisco is a great drawback, and even the expense of packing it to Prescott—\$50 per ton—is such that it is impossible to do anything with any but first-class ore, say that which will assay from \$750 per ton and upward; the rest must be worked nearer the mines or lie on the dumps until a day of cheaper transportation arrives.

The Wallace and the Sulphide, on the same belt, 10 miles east of the Peck, are two mammoth lodes running parallel with each other, and about 400 feet apart. The croppings stand up like immense towers, and are visible for miles.

The Antelope lode is in the same vicinity, and about 4 miles from Big Bug Creek. About 2 miles of this ledge has been located.

The Occident, Black Warrior, Oriental, Old Dominion, Evening Star, Del Pasco, Antelope, and Wild Pigeon are all promising lodes located not far from the Peck and Silver Prince.

The War Eagle lode has been worked for more than a year, and has paid handsomely by the arrastra process. The ore yields on an average \$70 to the ton, and there is much free gold.

The Senator Mine is situated in the *Hassayampa district*, about one mile from the creek of that name, and distant some 12 miles from Prescott. The lead runs along with the hill on the backbone of the mountain, and is traceable for about two miles. It is gold-bearing, well defined, and has every appearance of a true fissure-vein. The deepest shaft is 106 feet, and there is an eastward drift 80 feet, and at the end of that lead a body of ore 7 feet wide, and about the same distance west another

body 5 feet wide. The late workings of the ore average about \$30 per ton, being about 50 per cent. of the contents of the rock. At a depth of 25 feet sulphurets were struck, but are worked by the free-gold process.

The Senator 10-stamp mill is situated on the Hassayampa Creek, and is run by steam, the ore from the mine being hauled by teams over a good road built by private enterprise.

Already about 3,000 tons have been worked at the mill. About one-half of the ore going through the mill is saved by means of riffle-slucies, with a view of reworking it at some future time.

The ores of the General Crook and the Empire Gold-Mines are worked by a 5-stamp mill, and yield a good return.

The Accidental Mine, upon Lynx Creek, from which very rich and beautiful specimens of gold quartz have been taken for years past, is now steadily worked. The vein has an average width of 2 feet, and is extensively tunneled and shafted. Over a thousand tons of ore have been crushed by arrastras run by steam, giving a yield of \$25 to \$75 per ton.

Of late discoveries in the *Big Bug district*, C. E. Hitchcock, esq., (long identified with the district,) wrote at length in a letter in October, 1875, from which the following is an extract:

The first recent silver discovery was made only a few months since in Big Bug mining-district, about 15 miles southeast of Prescott, where rich silver-ores had been previously known to exist. This first discovery was, singularly enough, named The Silver Belt.

Subsequent discoveries have proved this mine to be on a silver belt 2 miles wide and about 20 miles long, this mine being on the northeastern end of a belt which commences at the Agua Fria Valley, running southwest through the mountains on the headwaters of the Big Bug, Lynx, Turkey, and Hassayampa Creeks to Walnut Grove, a distance of about 25 miles.

The Silver Belt Mine is located about half-way between Agua Fria Valley and the Big Bug Mill, 15 miles southeast of Prescott. On it a shaft has been sunk to the depth of 25 feet, showing a continuous vein with well-defined wall-rock, and, what is considered evidence of true fissure-veins, a continuous gouge of talc. About 10 tons of first-class ore, assaying \$600 per ton, has been shipped to San Francisco, and there is now on the dump from 40 to 50 tons of ore that assays from \$150 to \$300 per ton.

Several extensions have been located on the vein, and parallel with it are several veins located which show ores that assay from \$150 to \$600 per ton.

The Gopher Mine, situated about 2 miles southwest of the Silver Belt, was discovered the latter part of May. A shaft 60 feet deep shows a continuous vein of ore that assays from \$50 to \$450 per ton.

Several other veins have been discovered at various points from 3 to 10 miles southwest that show on the surface ores that assay from \$30 to \$400 per ton. Among these recent discoveries are several galena-veins from 1 to 2 feet wide, the ores from which give assays from \$25 to \$50 per ton. One of these veins, situated about 4 miles southeast of the Big Bug Mill, crops out about a foot high for a distance of several hundred feet, the vein of solid galena actually forming a dam to the water in a ravine which it crosses. A blind prospector would have tumbled over such a vein.

Of the Silver Belt, T. J. Butler, esq., editor of the *Arizona Miner*, (Prescott,) writes:

The quality of the ore is no longer a question, and we trust further development may prove the quantity to be equally satisfactory. They have out about 50 tons of ore, procured in sinking a shaft 70 feet on the ledge. This ore varies more in richness than in the character of the metal it carries, and Mr. George Hogle, a practical assayer and mineralogist, who has charge of the work, as well as Mr. Brown, an old silver-smelter, confidently believe that there is nothing in its chemical combination to prevent its being smelted without difficulty. The ore, so far as can be judged without analysis, are sulphurets of silver in combination with galena and a trace of antimony. Yet there are seams all through the rock, and little pockets filled with what appears to be chloride of lead, but upon collecting and washing it is found to contain considerable quantities of metallic silver. A small furnace with a fan-blower, to be run by horsepower, is erected and lined with a fire-clay found in the mine and mixed with quartz-tailings.

Of the Isabella, in the same district, he says:

This is not a large lode, nor extraordinarily rich, but is admirably situated for being worked cheaply, and is well opened on the surface for nearly a hundred feet in all, besides having a shaft down 25 feet in one place, at the bottom of which the vein is about 3 feet wide. A ditch has been brought into the lode and several tons of pay-ore ground, sluiced out, and piled up ready to be sent down on a tram-way to the creek, where the battery from the Big Bug Mill will be set up, and run by water from the ditch to crush it. Mr. Hitchcock informed us that in sluicing out the ore now on hand they saved from \$12 to \$18 per day, in free gold, to the hand, which is sufficient evidence of the value of the vein-matter, aside from what may be in the rock itself. The Isabella runs parallel with the Eugenia, and dips into the mountain toward the other; is of the same character of ore; and, as the Eugenia is a perpendicular ledge, it is believed that at a depth of several hundred feet they come together and form one ledge; or, in other words, that the Eugenia is the ledge and the Isabella a spur. They have crushed some seven or eight thousand tons from the Eugenia, with good results, but it is quite inaccessible on account of its great elevation, and if it can be reached through the Isabella, it would greatly facilitate its working and render it much more profitable.

The Sexton Mine, in the *Weaver district*, south of Prescott about 50 miles, is in the famous Antelope Hill, from the top of which the largest gold nuggets yet found in the Territory were taken in 1863 and 1864.

The vein runs northeast and southwest. It has been prospected by six or eight shafts, running down small distances, and by a tunnel driven into the hill 100 feet from the surface. The first vein cut by tunnel is 10 feet 9 inches in width. The companion vein has not been cut by tunnel, but appears much larger on the surface. The vein increases in size as it penetrates the ground. Both veins, on the surface, have an apparent width of 30 feet. This is owing to the disintegration of the quartz and the confusion with which it is piled up on the surface. The veins are true fissure-veins, cutting the strata at right angles, and situated at the junction of the primitive and secondary formation, in metamorphosed azoic rocks, on the foot-hills of a large granite mountain on the north and talcose clay-slates south and east. The walls are talcose slate, the same as in the Vulture Mine. The ore, from its disintegrated character, is easily crushed, and 10 stamps would reduce 15 tons in one day of 24 hours. The gold is free, and without the presence of any minerals that would prevent amalgamation. Much "specimen" rock has been found. The surface of the mine is covered with immense cappings, the result of the disintegration of centuries, and plainly distinguishable at a long distance.

Fifty tons of ore taken from cappings indiscriminately, and broken in the Vulture Mill, (at Wickenburgh,) gave a return of \$15 per ton. Ore since crushed in arrastras has yielded \$37 per ton. Three tons of ore from one of the spurs produced \$573 in gold.

Mr. Stanton, one of the owners, writes:

The ore in the tunnel gets better in depth, and, in my opinion, as soon as we get below where the immense body of spurs, which shoot out in all directions, connect with the main vein, it will get much richer. There are over two hundred of these spurs, running out in all conceivable directions from the mother vein, all of which are rich in gold, and vary from 3 to 18 inches in thickness. Some of them run a distance of one mile from the mother vein, others 400 yards, and some not over 250 feet. Generally they give out at a distance of 12 to 25 feet, but some go down to a depth of 70 feet. The Marcus main shaft is down to a depth of 90 feet, and is twice richer than on the surface. The sulphurets yielded \$800 per ton. These are all spurs of the Great Sexton. They have no walls, and run straight down without any pitch. The Marcus spur can be plainly traced to where it intersects the Sexton at the tunnel. All these spurs impoverish the main lode on the surface.

The great body of ore in this mine, (even should it not average over \$20 to \$30 per ton,) and its location upon the highway from Wickenburgh to Prescott, make it a very desirable property, and a movement is on

foot to organize a company in New York for its development upon an extensive scale. It promises to be a worthy rival of the great Vulture Mine, from which it is not over 40 miles distant, and which it closely resembles in many particulars.

During the year quite rich placers have been discovered in the *Santa Maria district*, about 80 miles southwest of Prescott. The gold is coarse, but of good quality, and a considerable quantity has been taken out. The lack of water is a drawback, and Americans are not usually expert in the Mexican process of "dry washing." The largest nugget yet found in these placers is valued at between \$50 and \$60.

The Arizona Miner has the following concerning a discovery of cinnabar:

Everybody about town will recollect that three or four weeks ago there was a little stir on account of some cinnabar-ore that was brought in by some prospectors. Numerous tests were made and quicksilver found in all the rock. John Malcomb and Joe Stone arrived in town Tuesday, having been out to make locations. They brought in about 20 pounds of ore. The lode is situated on the Verde River, which crosses it several miles below Squaw Peak, and shows for a long distance on both sides of the stream. Malcomb and Stone report that there are large holes along the vein, excavated evidently by Indians, who used the ore for paint. The ore is identical in appearance with the pieces which have been found in the old Indian camps for years past in Yavapai County.

MOHAVE COUNTY.

This county embraces the northwestern part of the Territory. Many mineral-bearing lodes have been found within its boundaries, and some near to the Colorado River have been favorably known for a number of years past. The principal mineral belt developed to this time extends from the southern line of the county north about 100 miles, and runs parallel with the Colorado River, and about 30 miles east of the same.

McCrackin district.—Perhaps the most noted lode in the county is the McCrackin, named after the discoverer, a pioneer in Arizona. It was found in August, 1874, and has been quite extensively developed. The lode is well incased in walls, and is from 15 to 39 feet in thickness, and has every appearance of a true fissure-vein. The larger part of the ore taken out is base, containing lead and copper, but yielding an average of about \$75 per ton in silver. A San Francisco company is negotiating for the purchase of this valuable property.

One who visited the mine in June last writes:

At present the McCrackin Mine is working some thirty or forty men, which number will be increased as soon as tools and other facilities which are requisite arrive. I was at the mine a few days ago, and was just in time to see a new strike of some of the richest ore ever taken out of the mine. This large body of rich ore was struck on the claim known as the Senator, and was the richest I ever saw. It was about five feet wide and looked more like a mass of chloride of silver than common ore.

The McCrackin bed of mineral has been traced for several miles, and many locations have been made upon it which seem to be nearly as rich as the discovery claim.

The Greenwood Mine is one of the largest gold-mines in Mohave County. There are 1,000 tons of fine milling-ore out on the different dumps at this mine, and many thousand more in sight. The owners of this valuable property intend adding several more stamps to their mill, and are thinking of purchasing another mill of twenty stamps.

Twenty miles north of the McCrackin district is the *Cedar district*, in which the Hope and Hibernia lodes assay from \$100 to \$1,000 per ton.

In the Wallapai Mountains, 30 miles north of the Cedar district, a

shaft has been sunk to the depth of 100 feet upon the Dean lode. It shows a vein about 8 feet wide, with regular walls, and containing silver-ore of a high grade.

The Cupel and Tiger Mine is considered one of the most promising mines in *Wallapai district*.

The Oro Plata Mine is looking remarkably well. There are already 50 tons of ore on the dumps, that will work from \$100 to \$300 per ton, principally gold. This mine has been extensively worked, and there are now many tons of ore in sight, which the owners expect to have worked in the new mill at Mineral Park.

Mr. Thomas Christie has shipped nine tons of ore from his mine, the Metallic Accident, near Mineral Park, and he confidently expects to get from \$1,200 to \$1,500 per ton for it in San Francisco.

Cerbat range.—North of the Wallapai Mountains, in the Cerbat range, hundreds of locations have been made, nearly all of which show rich silver-ores. Some promising gold-lodes have also been found. A considerable amount of ore has been shipped to San Francisco, and profitably sold.

The mining-towns of Cerbat and Mineral Park are located in these mountains; the former is the county-seat. Several mills and furnaces have lately been erected, but the writer has not been able to secure any report of the amount of ore reduced.

The most important lodes in this district are the Keystone, Lone Star, Shoulder, Empire, Little Grant, and Sixty-three. A fine body of ore is exposed to view in all the drifts and shafts upon the last-named lode. One of the shafts is down to a depth of more than 200 feet, the vein widening and improving.

The Mocking Bird Mine is situated about two miles east of Cerbat. At the bottom of the shaft, now over 100 feet deep, there is a fine body of ore. Two tunnels are connected with the shaft at a depth of 50 feet. From one of these a quantity of rich ore has been taken out.

Peacock range.—Twenty-five miles east of Mineral Park is the Peacock range of mountains, and at the north end of the range is located the Hackberry Mine. The mine is situated on the northeast slope of the mountain, about 1,400 feet above the valley. The rich vein of silver ore is from 10 to 18 inches thick, and will average one foot in thickness. The ore-vein lies upon its parent ledge and cleaves off free from it, so much so that it seems almost independent of the 6 to 8 feet of brown quartz that forms its foot-wall. The hanging-wall is a soft porphyry, with a thick stratum of white clay separating it from the vein. The vein has been opened by six shafts within a distance of 700 feet. The deepest shaft, at about 50 feet, (water-level,) developed a baser ore, and at 62 feet the vein is solid and 14 inches thick, and the ore averages \$340 per ton. From 50 feet down the ore will have to be roasted; above that it is free, and will work up to 80 per cent. with the ordinary treatment of salt and sulphate of copper.

Hon. A. E. Davis and W. B. Ridenour, esq., the discoverers, have put a 5-stamp mill on the Hackberry Mine, and have every reason to believe that it will pay well.

The facilities for mining are as good in this district as anywhere in Arizona. Water is abundant, and wood can be furnished at low cost, as there is much of it close at hand.

East of the Peacock range exploration has been extended into a lately unknown region, and a finely-timbered and well-watered country has been found, abounding in game and bearing a rich profusion of grasses.

YUMA COUNTY.

The principal mines in Yuma County, which comprises the southwestern part of the Territory, are those of the *Castle Dome district*, upon the Colorado River. They have so often been referred to in these reports that it will now suffice to say that recent work upon them has abundantly confirmed their permanency and value. Much ore has been shipped to San Francisco, where it has an established reputation, and finds a ready market.

W. J. Berry, esq., the editor of the *Arizona Sentinel*, published at Yuma, the county-town, recently said of these mines, with which he is personally familiar:

The whole district is almost one solid mass of metal. Thousands of tons of argentiferous galena have been shipped to San Francisco for reduction, and, after paying all expenses, have yielded a handsome return to the miner. Mr. Miller's furnace is in operation, and has turned out a vast amount of rich bullion, but it will require a hundred furnaces to smelt the ore that can readily be taken from these mines, and that for an indefinite time. And then this district has facilities unsurpassed for the mining and reduction of ores. Wood, water, and grass are abundant, and of the best. Lime and iron and fire-clay are also here in abundance, and a large navigable river runs almost at the base of the mines.

Captain Nagle, an owner in the Castle Dome mines, has lately erected at Yuma works for the reduction of argentiferous galena and all smelting-ores, which are likely to greatly facilitate mining operations in Yuma County.

He considers the location a fortunate one, because it is at a junction where the ores from Castle Dome, in which galena largely predominates, can meet those from Southwestern Arizona near the Sonora line, which are rich in silver, without carrying enough galena to form a flux, and that by combining the two the advantageous reduction of both can be made.

Placers.—New placers have been discovered near Ehrenberg, in this county. Rich gold-dust is found throughout an area about 40 miles in length and 15 in width. Nuggets worth from \$2 to \$10 have been taken out. There is little if any water, and the dry-washing process is used.

Mexicans continue to bring in gold from the vicinity of Gila City, 20 miles from Yuma, where placers have been worked for many years.

THE BULLION PRODUCT.

Mr. Valentine, the efficient superintendent of Wells, Fargo & Co.'s express business, published December 30, 1875, his annual statement of the product of precious metals on the Pacific coast, including British Columbia and the west coast of Mexico, but excluding New Mexico. In his accompanying remarks he said:

Prof. R. W. Raymond credits New Mexico (omitted in our statement) and Arizona combined with \$987,000, which is a liberal allowance. We have been unable to obtain any data that justify a showing so favorable.

This criticism requires me to state that my figures, referred to by Mr. Valentine, were given for New Mexico and Arizona separately, and not "combined;" that they were for 1874, not 1875; that the \$500,000 credited for 1874 to New Mexico was complained of by the citizens generally as too low an estimate; that the \$487,000 credited in the same year to Arizona was based largely on detailed reports, which are printed in my volume; that at the time Mr. Valentine compared my returns with his own, I had published no returns for the period he was considering; and that the governor of Arizona reported the product of

that Territory for the fiscal year, in an official communication to the Director of the Mint, as \$1,000,000.

Mr. Valentine's estimate of the product of Arizona for 1875 is as follows:

Gold dust and bullion by express.....	\$23,500
Ores and base bullion by freight.....	85,593
	109,093

That this is ridiculously low, no one who knows how many men are mining in Arizona can, for a moment doubt.

John Wasson, esq., surveyor-general of Arizona, and editor of the Arizona Citizen, having been requested to furnish an estimate of the gold and silver product of the Territory for 1875, made the following response:

1. There are no express-offices in Arizona through which gold and silver are shipped, and hence no means of procuring reliable figures as to the amount.

2. Nearly every outgoing mail carries gold-bullion by the pound. The letter-postage per pound is only 96 cents, and the mail is regarded cheaper, and by many safer, than any other available way of shipment.

3. Individuals are constantly carrying out bags of gold and gold bricks and some silver bricks, all taking the utmost care, for prudential reasons, to conceal from the public both the fact and amount thereof.

4. Every steamer from Yuma to San Francisco carries considerable silver contained in shipments of ore.

5. The general belief is that the product of gold and silver in Arizona for 1875 was fully \$1,500,000; and this has been so often asserted by those most capable of knowing that any other statement would be regarded as not nearly so accurate.

Taking into consideration the natural tendency of resident observers to overestimate the aggregates of an industry which they know only in detail, and also the fact that bullion carried in private hands may subsequently be consigned to some public conveyance and be credited to another source than that of its origin, I think it advisable to set down the product of Arizona at \$750,000 for the year 1875; an estimate in which I regret that I must differ widely with Mr. Valentine's usually judicious figures.

METALLURGICAL.

PART II.

CHAPTER XI.

A CENTURY OF MINING AND METALLURGY IN THE UNITED STATES.

BY HON. ABRAM S. HEWITT.*

Mining enterprises were among the motive powers to the exploration, conquest, and colonization of the New World. The desire to find a shorter route to the profitable trade of India, and the desire to conquer new territory, wherever it might be found, in the name of some Catholic or Protestant sovereign of Europe, were accompanied, both in North and South America, by eager hopes of the discovery of gold and silver.

The history of the plunder of the metallic wealth and the development of the mineral resources of Mexico and South America does not lie within my present purpose. The early enterprises of this kind in the northern part of the continent were less successful, though the progress of two hundred years has made them more beneficial, to national prosperity, for reasons which I shall, perhaps, be able to indicate.

Gold was found in moderate quantities in use among the Indian tribes of the present Southern States. The Spaniards under De Soto, following this clew, and led on by stories, exaggerated or misunderstood, of their Indian guides, made a wide superficial exploration in search of the origin of this treasure. They are supposed to have excavated many of the diggings in North and South Carolina and Georgia which are now overgrown with forests; but no rich deposits appear to have been discovered and no permanent operations undertaken.

In the great charter of King James, by which, in 1606, the right to explore and settle the North American continent from the thirty-fourth to the forty-fifth parallel, was granted to the London and Plymouth Companies, it was provided that one-fifth of the gold and silver and one-fifteenth of the copper which might be discovered should belong to the Crown. One of the earliest expeditions of Capt. John Smith, in Virginia, was the exploration of the Chickahominy River, in the hope that it might constitute a water-way to the Pacific Ocean; and one of the next events in the history of the same colony was a mining excitement, such as would be called in our California tongue a "stampede," caused by the supposed discovery of gold; in which, fortunately, John Smith did not avail himself of his official position to take "stock." It is a curious circumstance that gold really occurs in that region, though

* The present chapter was prepared as an address before the American Institute of Mining Engineers, of which body Mr. Hewitt is the president for 1876. In consideration of services which I was able to render in the compilation of materials, and particularly in the tabulation of statistics, it was arranged that the address should also be furnished to me as a contribution to the present report, which, if it had been printed immediately after its transmission to Congress, would have appeared at about the time of the delivery of the address. In consequence of the delay in publishing these pages, Mr. Hewitt's address is already widely known through other mediums; but I do not feel called upon, on that account, to omit it here, since it contains matter of permanent and general interest.—R. W. R.

the glittering dust, of which a ship-load was sent by the deluded colonists to the jewelers of London, proved to be but mica or iron-pyrites; and it seems probable (albeit this suggestion is not based upon any explicit record known to me) that the presence of gold among the Indians, and the discovery of specimens of the quartz or slates of Virginia containing visible particles of it, gave rise to the general excitement, under the influence of which, without further tests of value, a large amount of worthless material was collected, to the neglect of necessary and profitable industry. From this point of view the Jamestown mining fever was the prototype of many that have since occurred—all of which may be summed up in the general expression, that the mine "did not pan out according to the samples."

A more promising industry was inaugurated at the same time by the sending of a quantity of iron-ore from Jamestown to England in 1608. This ore, smelted in England, yielded seventeen tons of metal, probably the first pig-iron ever made from North American ore. In 1620, a hundred and fifty skilled workmen were sent to the colony to erect iron-works; and it is said that a fund, subscribed for the education of the colonists and Indians, was invested in this enterprise, as a safe and sure means of increase. But, in 1622, an Indian massacre broke up the enterprise; and both the manufacture of iron and the education of citizens and Indians have been obliged, ever since, to rely upon other sources of support.

For an interesting collection of facts relative to the beginnings of the iron industry of the American colonies, I refer you to the forthcoming work on that subject, by our fellow-member, Mr. John B. Pearse, to whose courtesy I am indebted for the opportunity to consult the advance-sheets of a portion of the book.

According to the statement of Colonel Spotswood, quoted by Mr. Pearse, it appears that, previous to 1724, neither New England, Pennsylvania, nor Virginia possessed blast-furnaces. Their product of iron was from bloomeries only. According to Professor Hodge, quoted by Professor Whitney, however, a furnace was built at Pembroke, Mass., in 1702; and another authority states that, in 1721, New England possessed six furnaces and nineteen forges. In 1719 was passed the famous resolution of the British House of Commons, "that the erection of manufactories in the colonies tended to lessen their dependency on Great Britain." Only the earnest protest of the colonial agents prevented the prohibition at that time of the American iron manufacture. The next thirty years witnessed two instructive contests. The first was that of the colonial with the domestic pig-iron manufacture—a competition in which America was favored by the abundance of her vegetable fuel (the employment of mineral coal in iron-making not having yet found introduction) in comparison with the rapidly-waning forests of Great Britain. The British manufacture being protected by heavy duties on colonial pig-iron, the latter began to be more and more worked up into bar iron, nails, steel, &c., at home; and this brought on a new competition with the British manufacturers of these articles. In 1750, a further legislative attempt to regulate this trade was made by Parliament, which decreed the admission of colonial pig-iron duty free, but prohibited the erection in America of slitting, rolling, or plating mills, or steel furnaces, ordering that all new ones thereafter built should be suppressed as "nuisances."

It will be recollected that arbitrary acts of this kind, for the destruction of our infant manufactures, were among the grievances cited in the Declaration of Independence. The extent of the American iron manufacture, during the ante-revolutionary period, can be inferred only from

scanty records of exports. These, beginning in 1717 with three tons, had increased in 1750 to about 3,000 tons; in 1765, the total is reported at 4,342 tons; and in 1771 at 7,525 tons, the maximum annual export. The outbreak of the war of course put an end to exportation and caused a great demand for war material, which occupied and rapidly extended the means of manufacture possessed by the country. The expanded iron industry suffered a severe collapse when, at the close of the war, not only this demand ceased, but the re-opened ports admitted large quantities of foreign iron—the successful employment of mineral coal, the steam-engine, and puddling having by that time laid the foundation of English supremacy in the iron manufacture.

The earliest copper-mining company of which we find any record—according to Professor Whitney, in his excellent work on the metallic wealth of the United States, the earliest incorporated mining company of any kind—was chartered in 1709, to work the Sinsbury mines, at Granby, Conn. These mines were abandoned in the middle of the eighteenth century, afterward bought by the State of Connecticut, and used as a prison for sixty years. Mining was resumed in them about 1830, and after a few years they were again abandoned. The ores were mostly shipped to England, and seem to have been lean. The deposit belongs to the class of irregular bunches, nodules, seams, or limited beds, in the New Red Sandstone, near its junction with trap. This formation was the scene in New Jersey, also, of early mining activity. The Schuyler mine, near Belleville, on the Passaic, was discovered about 1719, and proved more profitable to its owners before the Revolution than it ever has been since that time to any of the series of individuals and companies that have expended large sums in its development. In fact, the chief blessing conferred upon mankind by the Schuyler mine arises from the circumstance that the first steam-engine ever built wholly in America was constructed in 1793-'94 at the small machine-shop attached to the smelting-works at Belleville, my father being the pattern-maker in the party of mechanics sent out by Boulton & Watt for the purpose of erecting an engine for the Philadelphia water-works in Center Square. In 1751 a copper-mine was opened near New Brunswick; and the Bridgewater mine, near Somerville, was operated previous to the Revolution, though even then, it is said, with much loss of capital. New Jersey's record in copper-mining is not a cheerful one; but her unsurpassed ranges of iron-ores may well console her. Betrayed by the treachery of Triassic and trap, she can flee to the shelter of the crystalline schists. Pennsylvania was not without her copper-mining in the colonial period, the Gap Mine, in Lancaster County, having been opened in 1732.

Already during the colonial period the first red gleams of the future glory of the Lake Superior mines had appeared. The intrepid Jesuit fathers, Marquette and others, who penetrated the wilderness from Acadia to the Gulf, to carry both the Cross of their religion and the Lilies of their sovereign, had made extensive explorations on the Upper Peninsula, and published glowing accounts of the abundance of copper, to which later travelers added legends of gold and precious stones. Before them, the Indian tribes, whose stone tools now furnish subjects of inquiry to the archæologist, had wrought rudely upon the deposits which nature had left in a condition so exceptionally pure as not to need, for the production of limited amounts of metal, the intervention of metallurgical processes. The first recorded mining operations on the part of white men were those of Alexander Henry, near the Forks of the Ontonagon, in 1771. As is well known, however, the active development of this region dates from the publication of Houghton's Geological Report, in

1841, and the extinguishment of the Chippewa title by the treaty of 1843.

Lead-mining in this country may also claim an ancient origin—as we reckon antiquity. As early as 1651, Governor John Winthrop received his famous license to work any mines of “lead, copper, or tin, or any minerals, as antimony, vitriol, black lead, alum, salt, salt-springs, or any other the like,” and “to enjoy forever said mines, with the lands, woods, timber, and water within two or three miles of said mines.” As he received also a special grant of mines and minerals in the neighborhood of Middletown, Conn., it is not unlikely that the old Middletown silver-lead mine, the date of the discovery of which is not precisely known, was opened by him or his successors. The nickel and cobalt mines near Chester, in Connecticut, once held to be very promising deposits, are also believed to have been originally worked by Governor Winthrop; but nickel was not valuable in those days; and the lead and copper in these ores do not seem to have been abundant. Unfortunately, now that nickel and cobalt are so valuable as to repay amply the cost of extracting them when they are present in a small percentage only, these Connecticut ores no longer correspond (if indeed they ever did) to the analysis and accounts formerly given as to their nickeliferous character.

The old Southampton silver-lead mine in Massachusetts, well known to mineralogists, was commenced in 1765 by Connecticut adventurers; but its operations were suspended by the revolutionary war. Lead mines in Columbia and Dutchess Counties, New York, were also worked at an early period; and, no doubt, all over the country occupied or controlled during the war by the American forces, there were small and desultory surface operations, furnishing lead for the use of the Army.

The Indians inhabiting the Mississippi Valley before the advent of the whites probably did not understand the metallurgy of lead. Galena has been found in the western mounds, but, it is said, no lead. In 1700 and 1701 Père Le Sueur made his famous voyage up the Mississippi, discovering, as he claimed, many lead mines. Lead mining was begun in Missouri in 1720, while that country belonged to France, and under the patent granted to Law's famous Mississippi Company. Mine la Motte, named after a mineralogist who came over with Renault, the superintendent, was one of the first discoveries. It has been in operation at intervals ever since, and is now successfully managed by Mr. Cogswell, a member of our institute, who may, I think, truthfully claim that he has charge of the oldest mining enterprise still active in the United States. The ores yield a small percentage of nickel and cobalt, as well as lead.

It was in 1788 that Dubuque obtained from the Indians the grant under which he mined, until the year of his death, where the city now stands which bears his name. The land was subsequently ceded to the United States by the Indians, and the representatives of Dubuque were forcibly ejected.

Such, then, was the condition of our mining industry at the commencement of our national existence. We occupied but a strip of territory on the Atlantic; and even in that limited area we had scarcely learned the nature and extent of the mineral resources to be utilized. Anthracite and petroleum, quicksilver and zinc, were unknown as treasures within our reach. The rapid extension of possession, government, population, and industry over plains and mountains to the Pacific, which has been effected in a hundred years, is but the type of a conquest and progress which has advanced with equal rapidity in every department of human labor, and nowhere more notably than in the departments of mining and metallurgy. The tables which Dr. Raymond has prepared, and which will be printed to accompany these remarks, show that this

country has produced during the century ending with 1875, of gold, about 66,680,000 troy ounces, worth about \$1,332,700,000; of silver, about 201,300,000 troy ounces, worth about \$261,450,000; of quicksilver, 840,000 flasks, or 64,206,000 pounds avoirdupois; of copper, 200,000 tons; of lead, 855,000 tons; of pig-iron 40,000,000 tons; of anthracite coal, 351,521,423 tons, (the ton in all these cases being 2,240 pounds avoirdupois;) and of petroleum, 76,594,600 barrels. The product of these leading industries for the year 1875 were: gold, \$33,400,000; silver, \$41,400,000; quicksilver, 53,706 flasks; copper, 15,625 tons; lead, 53,000 tons; pig-iron, 2,108,554 tons; zinc, about 15,000 tons; anthracite, 20,643,509 tons; bituminous coal, about 26,000,000 tons; petroleum, 8,787,506 barrels.

In order that a clear idea may be formed as to the relative position now held by the United States in the world of mining and metallurgy, I have selected the production of coal, which is the main reliance for power of all organized industry, and of iron, which is the chief agent of civilization, as the basis of comparison with other nations, using, so far as coal is concerned, the figures given in the Forty-second Annual Report of the Philadelphia Board of Trade, for the year 1873.*

	Tons.	Per cent.
Great Britain.....	127,016,747	46.4
United States.....	50,512,000	18.4
Germany.....	45,335,741	16.5
France.....	17,400,000	6.4
Belgium.....	17,000,000	6.2
Austria and Hungary.....	11,000,000	4.0
Russia.....	1,200,000	0.5
Spain.....	570,000	0.2
Portugal.....	18,000	—
Nova Scotia.....	1,051,567	0.4
Australia.....	1,000,000	0.4
India.....	500,000	0.2
Other countries.....	1,000,000	0.4
Total.....	273,704,055	100.0

The following estimate, in round numbers, of the world's present production of iron is taken from various sources, and may be considered approximately correct. The figures for Great Britain and France are those of 1874, and the product of the United States for the same year has been taken. For other countries the estimates are principally for 1871 or 1872, except Austria and Hungary, for which the official returns for 1873 have been taken.

The quantities are given in tons of 2,240 pounds.

	Tons.	Per cent.
Great Britain.....	5,991,000	45.2
United States.....	2,401,000	18.1
Germany.....	1,600,000	12.1
France.....	1,360,000	10.3
Belgium.....	570,000	4.3
Austria and Hungary.....	365,000	2.7
Russia.....	360,000	2.7
Sweden and Norway.....	306,000	2.3
Italy.....	73,000	0.5
Spain.....	73,000	0.5
Switzerland.....	7,000	—
Canada.....	20,000	0.2
South America.....	50,000	0.4

* I wish to acknowledge, for these and other figures relating to coal, my obligations to Mr. R. P. Rothwell, who has freely placed at my disposal the very extensive and elaborate compilations of statistics which are to form the basis of an exhaustive paper by his experienced hand on that subject.

	Tons.	Per cent.
Japan.....	9,000	0.1
Asia.....	40,000	0.3
Africa.....	25,000	0.2
Australia.....	10,000	0.1
Total.....	13,260,000	100.0

An examination of these tables will serve to show that in the products which measure the manufacturing industry of nations, Great Britain stands first and the United States second on the roll, and that there is a clear and almost identical relation between the product of coal and the product of iron. The United States now produces as much coal and iron as Great Britain yielded in 1850. We are thus gaining steadily and surely upon our great progenitor, and in the nature of things, as the population of this country grows, must, before another century rolls around, pass far beyond her possible limits of production, and become the first on the international list, because we have the greatest geographical extent, and our natural resources are upon so vast a scale that all the coal area of all the rest of the world would only occupy one-fourth of the space in which, within our borders, are stored up the reserves of future power.

In a hundred years we have thus reached a point at which for coal, iron, gold, silver, copper, lead, and zinc, we are independent of the world, with abundant capacity to supply as well our growing wants, as to export these blessings of civilization to other and less favored lands, as soon as our labor and our legislation are adjusted to the conditions which will enable us to compete in foreign markets. One hundred years ago we proclaimed our political independence, and we maintained it by force of arms; we are now in a position to proclaim our industrial and commercial independence, and maintain it by the force of peaceful agencies against friendly competition.

A striking view of this prosperous development is presented by the magnificent mineral collection under the charge of Professor Blake, in the Government building at the neighboring Exposition—a collection which constitutes the first worthy National Museum of Mining and Metallurgy.

Never was a century of free government celebrated under such favorable conditions; never was free government so justified by the material results it has produced. But let us not conceal from ourselves the fact that mere growth in wealth, mere development in industry, mere increase in population are not the best evidences of national greatness; and unless our progress in art, learning, morals, and religion keeps pace with our material growth, we have cause rather for humiliation than for glorification.

“Whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report” constitute the real glory of a nation, without which the magnificent material structure which in a century we have reared will disappear “like the baseless fabric of a vision.”

In a hundred years, as I have said, we have reached a point at which for every one of the minerals and metals named, we are independent of the world, having the capacity to supply our own growing domestic demand, and also to export to foreign lands.

It is not my purpose to trace in detail the steps by which this degree of progress has been achieved. The narration of successive events alone, without any discussion of underlying causes and accompanying effects, would consume far more time than I could command. So far as the leading epochs of the history are concerned, I think they may be fairly summed up in the following mere catalogue:

1. First of all, must be named the erection in Philadelphia, in 1794, of the first steam-engine in America. We celebrate this year the centennial anniversary of a greater power than the United States of America—a wider revolution than our War of Independence. It was in 1776 that James Watt presented to the world the perfected steam-engine, all the improvements of which since his day are not to be compared with those which he devised upon the rude machines of his predecessors. In one hundred years, the steam-engine has transformed the face of the world and affected to its remotest corners the condition of the human race. Few changes have been so profound; not one in history has been so rapid and amazing. With reference to the special subject now under consideration, if I were asked what elements had most to do with the swift progress of our country, I should answer, freedom and the steam-engine. But deeper even than any organized declarations or outward forms of freedom lies the influence of the steam-engine, which has been from the day of its birth, in spite of laws and dynasties, and all accidents of history, the great emancipator of man.

2. *Gold mining in the South.*—Already Jefferson, in his "Notes on Virginia," mentioned the finding of a lump of gold, weighing seventeen pennyweights, near the Rappahannock; and, about the beginning of this century, the famous Cabarrus nugget, weighing twenty-eight pounds, was discovered at the Reed Mine, in North Carolina. But the great gold excitement in the South followed the discoveries in Georgia from 1828 to 1830. The maximum of production (probably never more than \$600,000 in any one year) was from 1828 to 1845, since which time it has declined to insignificance, though a few enterprises, both in hydraulic and quartz mining, are now actively prosecuted.

3. *The opening of the anthracite-coal fields and the use of anthracite in the blast-furnace.*—The first of these events practically dates from the year 1820, although some anthracite found its way to market much earlier, and the second from the year 1839. The latter was followed by the development of the vast anthracite-iron industry, which has contributed so much to the prosperity of Pennsylvania. The connection between anthracite and civilization was long ago pointed out by Sir Charles Lyell, in connection with his visit to this country, when he observed in this State, and in this very city where we now stand, the strange phenomenon of a vast manufacturing population dwelling in neat houses and able to keep themselves and their houses clean. This smokeless fuel is a great moral and æsthetic benefactor. It has also proved specially useful in metallurgy—one process at least, the American zinc-oxide manufacture, being impracticable without it; and in war no one will deny its superiority who remembers how our cruisers, burning anthracite, and hence not traceable at sea by their smoke, were able to spy and pursue the blockade-runners, whose thick clouds of escaping bituminous smoke betrayed them. A table of the production of anthracite is given herewith, and some further observations concerning its control and management will be appropriate under another head of my remarks.

4. *The use of raw bituminous coal in the blast-furnace.*—This was introduced in 1845.

5. *The development of the copper-mines of Lake Superior,* beginning in 1845 and increasing slowly but steadily to 1862, when about 8,000 tons of ingot-copper were produced; then declining for some years, to recover in 1868 and 1869 its lost ground, and since the latter year, by reason of the great production of the Calumet and Hecla Mines, to attain an unprecedented yield. The tables of copper production for

the United States, herewith given, show that our present product is not far from 16,000 tons, of which three-fourths must be credited to the Lake Superior mines.

6. *The discovery of gold in California*, in 1848, or rather its rediscovery, since it had previously been known to both the natives and the Jesuit missionaries, and also to hunters and trappers. The wonderful direct and indirect results of this event have been too often the theme of orators, historians, and political economists to need a further description from me. Its direct result in the way of mining was the rapid exploration of the western Territories by eager prospectors, and the successive development of placer-mines in nearly all of them. It is difficult to fix the dates of these beginnings; but we may assume with sufficient accuracy that gold-mining practically began in Oregon in 1852, in Arizona in 1858, in Colorado in 1859, in Idaho and Montana in 1860. With the completer exploration of the country, and the decline of the placer-mines, stampedes have grown less frequent and extensive than in the earlier days. There is scarcely any corner of the country left, except the Black Hills of Dakota, which has not been ransacked sufficiently to show whether it contains extensive and valuable placer deposits; and those districts which present accumulations of gold in such a way as to offer returns immediately to labor without capital have been already overrun. The principal reliance of our gold-mining industry for the future must be quartz and hydraulic or deep gravel mines. These may be expected to maintain for years to come their present rate of production, if not to increase it. In the table of gold production, herewith given, there is, it is true, a falling off of late years, but this is to be attributed to the placer-mines.

7. *The commencement, about 1851, of regular mining operations at the New Almaden quicksilver-mine, in California.*—The production of this metal in the United States has been thus far confined to the State of California, and it will be seen from the table of the production of the New Almaden mine that it has always furnished a large, though of late a waning, proportion of the grand total for the country.

8. The middle of the nineteenth century was crowded with important events in metallurgy and mining. It was in 1856 that Mr. Bessemer read his paper at the Cheltenham meeting of the British Association for the Advancement of Science, which inaugurated for both continents the age of steel. Within sixty days after that event an experimental Bessemer converter was in readiness at the furnaces of Cooper & Hewitt, at Phillipsburgh, N. J. But the experiment was not carried far enough to demonstrate the value of the newly-proposed process, and it was left to the late John A. Griswold and his associates to introduce and perfect this wonderful method in the United States. I speak more briefly on this point than its far-reaching importance deserves; but in the presence of one whose acquaintance with it is so profound, and whose services in relation to it have been so brilliant as those of our honored president, Mr. Holley, and of so many gentlemen as I see before me who are worthily associated with him in its glorious history, I could afford to be silent altogether.

9. *The commencement of the hydraulic-mining industry.*—The position of the auriferous slates and quartz-veins on the west flank of the Sierra, with the precipitous mountains behind them and the broad plain before, has favored exceptionally the formation of deep auriferous gravels in which California far exceeds any other known region. And the same topographical features furnish the two other prime requisites of hydraulic mining, namely, an abundant supply of water and a sufficient

grade of descent to permit the use of flumes and the escape of tailings. These advantages the keen-witted miners of the Pacific coast were quick to make available; and I think we may set down the invention of hydraulic mining which occurred, I believe, about 1853, as an epoch in the progress of American mining. It has given us an entirely new and original branch of the art, involving many ingenious hydrodynamic and hydrostatic contrivances; and it has certainly made possible the exploitation of thousands upon thousands of acres of auriferous gravel which could not have been profitably handled in any other way. The mountain torrents of the Sierra, caught on their way to the Pacific, have been forced to pause and do the work of man. The same agencies that buried the gold among the clay and pebbles of the river-beds are now made to strip the covering from it and lay it bare again. The hydraulic mines produce at present not less than \$10,000,000 or \$12,000,000 annually; and many enterprises of this kind which have been prosecuted through years of expensive preparation and are now just beginning to touch their harvests of profit, will add henceforward to the product. I may mention as an illustration the extensive operations of the North Bloomfield and its two allied companies in California, which have expended in works \$3,500,000, and will have six deep tunnels, aggregating over 20,000 feet, and canals supplying 100,000,000 gallons of water daily.

10. We must turn for a moment to the East again, to note the commencement of iron-mining at Lake Superior, about the year 1856. The extraordinarily pure and rich ores of the upper peninsula of Michigan now find their way, to the extent of a million of tons per annum, in fleets of vessels across the lakes to Cleveland, and are thence distributed to the furnaces of Ohio and Pennsylvania. The similarly pure Missouri ores have built up in like manner their own market. The growth of the Lake Superior iron business is shown in the accompanying table.

11. The next great event in the history of American mining was the discovery, in 1859, that the Comstock lode was rich in silver. This opened an era of activity and speculation which has scarcely ceased since that time. Single districts have been subjected to fluctuating experiences, passing from the first enthusiasm through all the stages of hope to reaction and despair; but though the fortunes of each have risen and fallen like the changing tide, it has nearly always been high water somewhere. Thus we have had a succession of favorites in the way of silver-mining districts, each one crowding its predecessor out of the public notice. Of these the following list includes the most permanently productive: In Nevada, the Unionville, Reese River, Belmont, White Pine, Eureka, Esmeralda, and Pioche districts; in California, the argentiferous district of Inyo County; in Idaho, the Owyhee district; in Utah, the Cottonwood and Bingham districts; in Colorado, the silver districts of Clear Creek, Boulder, and Summit Counties, to which the latest favorite, the San Juan region, may be added. I have named those localities in which mining industry is still active and flourishing. There is a longer and a sadder list, the funereal effect of which I will not intrude upon this festive occasion. But it ought to be remarked that the apparent failure and abandonment of many districts heretofore does not argue their lack of prospective value. It is, on the contrary, amazing that under the adverse conditions surrounding the industry of mining in regions "remote, unfriended, solitary"—though not "slow"—so many communities should have succeeded in taking permanent root. Too much is expected of this industry when it is required to supply the lack of labor, food, transportation, government, and the organized support

which in settled societies all the trades and occupations give to each other. Pioneer work is full of peril and of waste; and in view of the wonderful results achieved by our pioneers in mining, it ill becomes us to sneer at the losses and failures which constitute the inevitable cost of such conquests. When the battle has been gloriously won, and the spoils of victory are ours, we do not greatly mourn over the number of bullets that may have been fired in vain.

But through all the vicissitudes of silver mining in other districts, the Comstock mines have maintained their place, an instance of rapid exploitation, and of aggregated wealth of production unexampled in history. Here, too, there have been intervals of failing hope; but a new *bonanza* has always made its appearance before the resources at hand were entirely exhausted; and we have seen extracted from the ores of this one vein, during the past fifteen years, the round sum of \$200,000,000 in gold and silver. Dr. Raymond, in the table herewith given, assumes the product of gold to have been (on the authority of Mr. Hague) about 40 per cent. of the entire value. We have, therefore, from the Comstock mines during the period named, \$80,000,000 gold, and \$120,000,000 silver.

The swift development of these mines, and the active commencement about the same time, of deep quartz mining operations in California, led to a remarkable progress in mining machinery, and to the perfection of two distinctively American processes. I refer to the California stamp-mill and amalgamation process for gold, and the Washoe pan-process for silver. Neither of these is so novel in principle as the hydraulic-process of gold mining already mentioned; but both of them have received the peculiar impress of an ingenuity and mechanical skill, partly innate in our national character, and partly the product of the stern pressure of economic necessities. Into the fruitful field of further metallurgical improvements born of our Western mining industry—or adopted by it—such as the Blake rock-breaker, the Stetefeldt roasting-furnace, the Brückner cylinder, the Plattner chlorination, and many others less widely known, I cannot enter here. Our people have advanced in this line with headlong energy, and accomplished great results—at great expense. Much, undoubtedly, remains to be done, and it may be hoped that future progress will be equally rapid, but less costly. The introduction three or four years ago of the smelting processes of Europe for the treatment of the silver ores of the West is a striking and encouraging instance of the quickness of our mining communities to seize upon the advantages of experience elsewhere as soon as they are brought to notice. The ignorance which has led to many disasters in such enterprises was not voluntary or obstinate. Give our people light, and they do not keep their eyes shut. I am assured that already the smelting works in the West present many features of interest and suggestiveness even to the study of our skillful colleagues from abroad.

12. I may be permitted, in closing this imperfect review, to refer to the great improvements in mining machinery, in rock-drilling, in explosives, in the use of gaseous fuel, in the construction and management of blast-furnaces, puddling-furnaces, rolling-mills, and other branches of the iron manufacture, which have crowded upon us during the last ten years. It is impossible here to give even an enumeration of them which shall do them justice. They have been worthily commemorated in many papers before the Institute. With regard to one of them, the Martin process for the manufacture of open-hearth steel, I may speak with some personal satisfaction, since I had the privilege of introducing it into this country, after studying its merits in 1867 abroad. I am con-

vinced that it has a great future, as the ally, if not the rival, of the Bessemer process.

Returning now to the contemplation of the general field over which we have passed, we may inquire what the Government of the United States has done with regard to the mining industry. Other nations have elaborate mining codes and bureaus of administration. In comparison with these the meagerness of our governmental supervision of mining is remarkable; yet, in view of the progress I have sketched, may it not be possible that our system has been on the whole the best for us? Certainly a complicated mining code like that of Spain and Mexico, whatever it may have brought to the coffers of the State, seems to have conferred, in centuries of operation, little benefit upon the people.

The common law of England is the foundation of our jurisprudence in this, as in so many other respects. According to that law, as laid down in a noted case in the reign of Elizabeth, all gold or silver ores belonged to the crown, whether in private or public lands; but any ores containing neither gold nor silver belonged to the proprietor of the soil. Apart from the claims of the crown, the property in minerals is, according to the common law, *prima facie* in the owner of the fee of the land, but the property in minerals, or the right to search for them, may be vested in other persons by alienation, prescription, or custom. Since the two latter rights require an origin beyond the time of legal memory, they are practically out of the question in this country. The crown right to the precious metals, as declared in the case referred to, was a survival or remainder of the royalty claimed in ancient times by the sovereign over all minerals. This sweeping claim, born of the despotisms of the Orient and made the subject of much conflict among emperors, fendal lords, and municipal authorities during the middle ages, dwindled at last till it covered only gold and silver. But it disappeared entirely from English America, for the simple reason that there was no private land ownership in this country, and the sovereign of England claimed, by right of discovery, soil and metals alike, barring only the Indian title, which it was his exclusive privilege (or that of his authorized representatives or grantees) to extinguish. After the Revolution, the United States succeeded to the rights of the British crown, and by the treaty of peace and the subsequent cessions by the different States of their colonial claims upon the public lands, the Federal Government became possessed of a vast domain over which, after extinguishing the Indian title, it had complete control. In the territories subsequently acquired from France and Spain, the United States assumed the rights and obligations of those sovereigns; and this circumstance, particularly in the adjustment of Spanish mineral and agricultural grants, has caused some apparent variations from the general policy. But it is sufficiently accurate to say that at the present time, throughout the country, the owner of the fee, or the party who has obtained from him by lease or purchase the mineral right, has supreme control. The mining legislation of the United States, therefore, is simply a part of the administration of the public lands; and for this reason it is executed by the Commissioner of the General Land-Office.

In 1807 an act was passed, relating primarily to the lead-bearing lands of Illinois. They were ordered to be reserved from sale, and leased to miners by the War Department. The leases covered tracts at first three miles square, (afterward reduced to one mile,) and bound the lessee to work the mines with due diligence and return to the United States 6 per cent. of all the ores raised. "No leases were issued under this law,"

says Professor Whitney, "until 1822, and but a small quantity of lead was raised previous to 1826, from which time the production began to increase rapidly. For a few years the rents were paid with tolerable regularity; but, after 1834, in consequence of the immense number of illegal entries of mineral land at the Wisconsin land-office, the smelters and miners refused to make any further payments, and the Government was entirely unable to collect them. After much trouble and expense, it was, in 1847, finally concluded that the only way was to sell the mineral land, and do away with all reserves of lead or any other metal, since they had only been a source of embarrassment to the department."

Meanwhile, by a forced construction (afterward declared invalid) of the same act, hundreds of leases were granted to speculators in the Lake Superior copper region, which was, from 1843 to 1846, the scene of wild and baseless excitement. The bubble burst during the latter year; the issue of permits and leases was suspended as illegal, and the act of 1847, authorizing the sale of the mineral lands, and a geological survey of the district, laid the foundation of a more substantial prosperity.

This policy of selling the mineral lands has been that of the Government ever since. But it has necessarily been modified in the West by the peculiar circumstances under which that region has been settled. Before lands can be sold they must be surveyed; and before they can be sold as mineral lands, their mineral-bearing character must be ascertained. Our miners and explorers overran and occupied the Pacific slope in advance of the public surveys. They built cities that were not shown on any map; they cut timber, turned water-courses, dug canals, tunneled mountains, bought and sold their rights to these improvements under laws established by themselves, and enforced by public sentiment only. For nearly twenty years the Government looked on, without asserting its dominant ownership of the public lands; and when by the acts of 1866, 1870, and 1872, and other minor enactments, a general system was created, it was necessary to recognize as far as possible the rights which had grown up by general consent, and to seek only to give to them certainty, practical uniformity, and reasonable limitations. It is not my purpose to discuss in detail the mining laws of the United States, or to trace the curiously complicated origins of the local customs on which they are largely based. Suffice it to say that the system recognizes the English common-law principle, that the mineral right passes with the fee to the lands; so that, in the words of the Commissioner, (July 10, 1873,) "all mineral deposits discovered upon land, after United States patent therefor has issued to a party claiming under the laws regulating the disposal of agricultural lands, pass with the patent, and the Land-Office has no further jurisdiction in the premises."

But the principle is also recognized that the mineral right may be separated from the fee by the owner, whether he be an individual or the United States; and this principle is curiously applied in the form of patents for mining claims upon lodes, which, following the form of the possessory title, grant to the patentee the right to follow all veins, the top or apex of which lies within the exterior boundaries of his claim, downward to any depth, though they pass under the surface of the land adjoining.

As the size and the price per acre of the tracts sold under the agricultural laws are different from those to which the mining laws apply, and as, under the homestead law, a certain amount of agricultural land may be obtained without any payment, it is evident that no known mineral deposits can be acquired under the agricultural laws; and this

reservation is enforced both in the preliminary proceedings and in the patents finally issued under those laws.

With regard to the mineral lands, however, it is certain that the patent for a claim carries with it both the fee of the land and also a mineral right, though not the same mineral right as is contemplated by the common law, since it is enlarged on the one hand by the permission to follow mineral deposits beneath the surface of adjoining land, and limited on the other hand by the operation of the same permission in favor of the adjoining owner. The latter limitation is incorporated in agricultural patents also, and may become operative whenever they adjoin mining patents.

Previous to the application for a patent, the law permits free exploration and mining upon the public lands to all citizens and those who have declared their intention to become such. The rights of this class of miners under what is known as the possessory title, are regulated by local laws and customs, subject only to a few simple conditions which the United States enforces upon all, and which chiefly concern the maximum size of individual claims, the definite character of their boundaries and landmarks, and a certain quantity of labor which must be bestowed upon them annually in order to maintain possession. I will not pause to state the different features which these conditions present for lode and placer claims. It is sufficient to say that the miner conforming to them, and thus maintaining his possessory title, may, after a certain expenditure, and upon due application, survey, and advertisement, in the absence of any valid opposing claim, perfect his purchase from the Government, receive his patent, and be thereafter free from the necessity of performing any given annual amount of labor to hold his claim. There are features in the present law concerning the rights of prospecting tunnels which seem both obscure and unwise; and some serious questions remain to be settled as to the precise meaning of the law in these and other respects; but these we must pass by.

Looking at the legislation on this subject as a whole, we see that it is confined to one department—that of title. The whole system is devised to facilitate the purchase of mines by citizens. They are freely permitted to work them experimentally, but it is made their interest to buy them. No inspection, no police regulation, no technical control, is exercised by the Government.

Turning to the State and territorial legislatures, we find that they have, in some cases, provided for inspecting mines in the interest of the safety of workmen. Perhaps the best law of this kind is that of Pennsylvania, in which State the peculiar perils of coal-mining have forced the legislature to take measures of protection. But we find nowhere such a technical control of mining as is exhibited in many European states, where the government requires of the miner that he shall not waste wantonly or ignorantly the resources which, once exhausted, will never grow again. Our people waste as much as they like and no one interferes. Admitting that this is an evil, it still remains a matter of doubt how far, under the circumstances of our particular case, the supervision of authority could remedy it. For my own part, though inclined to restrict as far as possible the functions of government, I am not disposed to say that for so great an end as the conservation of the mineral wealth of the country, it may not properly enforce some measures of economy with as good right as it may forbid the reckless waste of timber or the slaughter of game out of season. But in our nation, at least, governmental interference is the last resort, and a poor substitute for other causes which, in the atmosphere of freedom

and intelligence, ought to be effective. We are, perhaps, in our material career as a nation, like the young man who has "sown his wild oats," and now, by mature reflection and the lessons of experience, is likely to be better restrained than by the hand of parental authority.

Permit me, in drawing my remarks to a close, to suggest two agencies which seem to me to be co-operating already, and to open still wider future prospect for the steady social and economical improvement of our mining and metallurgical industry.

The first of these is the spread of knowledge on these subjects throughout the country. Under this head we must recognize the great importance of that series of explorations of our great western domain, which was recommended by Mr. Lincoln, with sublime faith in the salvation of his country, in the midst of the civil war, and which has been, by the liberality of the Government, prosecuted under various departments ever since. I need hardly make special mention, in addition, of the reports of the Commissioner of Mining Statistics, which have appeared annually since 1866, and have reflected upon our own community the light of the gathered technical knowledge of the world, while they have in turn exhibited to the world the resources and the progress of America. Such works as these, together with the technical periodicals and the occasional volumes, translated or original, which have come from the American press, have contributed already a great deal to the education of our mining communities. The Government has not done too much in this direction; but it seems to me that it should continue this most necessary and proper work in a more systematic and uniform way. There ought to be no conflict of authorities, no duplication of work, no unnecessary expenditure of labor and money in the face of a task so great.

Next in order, I may rank the influence of the technical schools. The number of these has rapidly increased during the past ten years; and I venture to say that many of them compare favorably, in theoretical instruction at least, and several of them in the apparatus of instruction, with the famous schools of the Old World. The Massachusetts Institute of Technology, at Boston; the School of Mines of Columbia College, at New York; the Sheffield Scientific School of Yale College, at New Haven; the Stevens Institute of Technology, at Hoboken; the Pardee Scientific Department of Lafayette College, at Easton; the excellent school at Rutgers College, under the direction of Professor Cook; the new Scientific Department of the College of New Jersey; the School of Mining and Metallurgy of Lehigh University, at Bethlehem; the School of Mining and Practical Geology of Harvard University, at Cambridge; the Scientific Department of the University of Pennsylvania, in this city; the School of Mines of Michigan University, at Ann Arbor; the Missouri School of Mines and Metallurgy, at Rolla; the Polytechnic Department of Washington University, at Saint Louis; and the similar department of the University of California, at Oakland; and perhaps some others which I have omitted to name—this is a list of schools for instruction in the sciences involved in mining and metallurgical practice, of which we need not be ashamed. What our schools undoubtedly need is a more intimate relation with practice. But this theme I need not touch. It has been ably and amply discussed at the joint meeting last night of the two bodies most fully aware of all its bearings.

One more agency of the spread of technical knowledge deserves special mention. I refer to the influence of societies like the Institute of Mining Engineers. The five years' activity of this institute has im-

pressed upon the professions which it represents a spirit of union, an enthusiasm of progress, a mutual recognition of the claims of theory and practice, which cannot be too highly estimated. Perfect our schools as much as we may, the association of the young engineer with experienced engineers, the contact of his mind with mature minds, their recognition of his merit, their correction of his errors, constitute the necessary supplement to the school-training. The average man, at least, should not be left to wrestle with his professional career alone. He will make better progress and take more pleasure in it if he calls to his aid the element of social sympathy, and the intellectual re-enforcement expressed in the proverb, "Many heads are better than one."

One further consideration, and I have done. The effect of growing intelligence and knowledge in improving our methods of industry would come short of some great ends if it operated only through the self-interest of the individual. Many reforms are beyond the power of the individual; some are not even to his interest. Thus the miner, under a possessory title on a gold-bearing quartz-vein in Colorado, may know that with a greater investment of capital he could manage to reduce his losses of gold in extraction; but the capital may be wanting; or he may know that by robbing the mine of its richest ores only, and allowing it to cave, he is probably destroying more valuable resources than he utilizes; but the mine is only temporarily his, and he prefers quick gains to permanent ones. So long as the anthracite lands of Pennsylvania were leased to countless small operators, who paid royalty only on the coal which they sent to market, it was useless to explain to them that they wasted a third of the coal in the ground, and another third in the breaker, or that they ruined thousands of acres of coal-beds, overlying those which they recklessly worked. If there were no natural remedy for this wicked waste of the reserved force upon which the future prosperity and comfort of mankind depend, it would be the highest duty of Government promptly to take into its own hands the direction and management of the mines of coal which society holds in trust for the future; but already it is easy to detect the operation of a new social law developed within the memory of man, yet the fruit of the preparation of the ages during which society has been slowly built up, and matured into its present form and conditions.

To the philosophic observer, the controlling law which runs through the whole history of man, down to the present century, is the law of dispersion, diffusion, distribution, the centrifugal social force, so to speak, which by its irresistible power has tended not merely to scatter mankind over the face of the habitable globe, but through what are termed civilizing and christianizing agencies to place communities and individuals upon the common plane of equal rights in the domain of nature and before the law.

From the time of the confusion of tongues at the tower of Babel, through the long history of the early oriental empires, which reduced society to the rule of order and then broke up into fragmentary political organizations, retaining, nevertheless, the principles of cohesion acquired by bitter experience; through the Greek and Roman imperial political structures upon which were ingrafted the civilization and the religion which their downfall made the common heritage of the northern barbarians who came for destruction, but were themselves transformed into the apostles of a more liberal and enlightened social organization, this law of dispersion has never ceased to exercise its power and its supremacy. The very inventions of man are only so many proofs of the unceasing operation of this law. In warfare, gunpowder and fire-

arms merely enlarged the area over which it was possible to carry on military operations; the magnetic compass only widened the field of commerce; the printing-press and the telegraph are merely agencies for the diffusion of thought; the steam-engine is but a means whereby it becomes possible to establish local industries in every part of the habitable globe; and the canal and the railway are essentially distributors of the products and the wealth of the human race.

Although there is an impression abroad that this age is one of growing concentration of property, no man can study the history and the facts of the development of society without coming to the conclusion that at no period has there been so general and equal a distribution of rights and property as in the present age. The destruction of the feudal system was, in reality, the establishment of a new and better theory, in regard to the ownership of land, which has borne its legitimate fruits in the subdivision of estates in France, through the convulsions of a revolution; in the more general distribution of landed property in Germany, and in that steady, remarkable, and successful agitation in England, which is now showing its results in the limitation of entail, the simplification of transfer, the enlargement of the suffrage, and the acquisition of small freeholds, whereby political power is being slowly but surely transferred from the great landholders to the middle classes of the most powerful and compact political organization which the world has ever seen.

While, then, there is thus an unmistakable progress in the world towards a juster and more general distribution of the control of the resources of nature and of the fruits of human industry, the present century has, undoubtedly, developed a new and remarkable centralizing tendency, which might be denominated the centripetal industrial force. I speak of the application of the corporate principle to the management of industrial enterprises, producing a concentration of property and management through the diffusion of ownership. Under the corporate system, the number of owners may be unlimited, but the management is necessarily confined to a few hands. It is the political idea of representation applied to industrial enterprises; it is the common wealth in its industrial, and not in its political sense, which is concentrated for the material wants and progress of the human race. Now, this law of universal ownership, under limited management, heretofore applied with marked success during the latter half of the present century to great manufacturing establishments in this country, and of late in Europe, and of necessity to railroads everywhere, has at length, by slow but irresistible steps, taken possession of the great mining enterprises of the United States, and to-day has its strongest and most interesting development in the anthracite coal region, which may be said to be monopolized by six great corporations, administered by a very small number of able officers representing a vast body of owners who rely upon steady but not excessive dividends for their support. It is the fashion to denounce these corporations as monopolizers, but it is only the thoughtless who do not investigate below the surface, who take this view of what is really the most interesting and suggestive application in our day of a powerful and irresistible force originating in the very heart of the social fabric. The monopoly is not the monopoly of ownership, for everybody is free to buy and sell, and there is no day when a man with money may not, at its value, procure a share in these enterprises. And no one familiar with business will pretend that the profits have been out of proportion to the cost and the risk of the undertakings, and no more conclusive answer to any complaint on the score of

monopoly can be made, than that to-day the shares in these corporations, in many cases, are selling below the original money cost. These corporations are, in fact, not the creators, but the outgrowth of a new and beneficent principle, which has begun to assert itself in society, and will continue to grow in power until the end of time. This principle is the practical association of diffused capital, through the agency of corporate organization, with labor, for the promotion of economy, for the improvement of processes, and for the general welfare of mankind.

The capital is derived from innumerable sources, just as the little rills, finally, through streams and rivers, constitute the great ocean. The laborer himself may thus be the capitalist, and the capitalist may thus be the laborer, each taking his share of that portion of the fund which is appropriated to labor and to capital, and often in a double capacity taking a share from both.

In its perfect and ultimate development it embodies the Christian idea of "having all things in common," yet "rendering unto Cæsar the things that are Cæsar's."

The rate of profit which may be derived from these great enterprises, subject as they are to the scrutiny, criticism, and judgment of the public, in an age when nothing escapes notice, and all rights and property are virtually subordinated to the popular will, can never be excessive, for two reasons: on the one side the public will inevitably demand lower prices for an article of primary consequence in every household, and these corporations, creatures of the public will as they are, could not successfully resist such a demand, based upon excessive or unreasonable profits. On the other hand, whenever the dividends rise above a reasonable rate of compensation, the laborers engaged in the production of coal, from whom these profits cannot be concealed, will justly claim, and rightfully secure, a larger share of the fruits of their labor. The checks upon any unreasonable exercise of the power conferred by the ownership under limited management of the anthracite coal-fields, are in reality so powerful that the public have nothing to fear from this cause, but the corporations have rather reason to dread that they may not have justice at the hands of the public and the working classes. This justice they can only hope to secure by the wisest, best, and most economical management and administration of the property they control, and whatever profits they may hereafter derive and be allowed to divide among the owners will be rather due to the economies which they may be able to introduce, whereby the article is furnished at the lowest possible rate, than to any fancied monopoly which they may have in the coal itself, or in its transportation to market.

Already, by the application of adequate capital, guided by the largest experience and the highest technical skill, the anthracite coal-mines, from being worked in a wasteful and extravagant manner, are being rapidly put in the best possible shape for the economical delivery of coal at the surface, and for the preservation of every portion of the store upon which the future value of the property must depend. But besides economy in mining and care in preserving, there must be regularity and stability in the operations of the mine. There can be no real profit where these operations are subject to constant interruption, caused by strikes or other artificial impediments. The loss of interest on the plant at the mines and in the lines of transportation, caused by any serious stoppage to the works, would, of itself, be sufficient to render investments of this kind unprofitable. Hence the out-put must be regulated and proportioned to the wants of the market. But this regulation must be continuous and not spasmodic. To enable this to be done, large stocks

of coal must necessarily be kept on hand, in order that any sudden demand may be properly met without any serious increase in price; and in dull times the accumulation and restoration of the stock will give steady employment to the miners, to whose families any cessation of work is a calamity of the most serious character, and to society an unmitigated evil. To insure continuous operations, the best relations must exist between the corporate owners and the laborers in their employ. It is notorious that throughout the coal regions these relations have been of the most unsatisfactory character, resulting, at often-recurring intervals, in strikes and lock-outs, which have no redeeming feature, but, on the contrary, have raised the price of coal to the consumer, have impaired the dividends of the owners, and have reduced the workmen and their families to a condition of suffering and demoralization appalling to every well-wisher of his race. It is fortunate, therefore, that the interests of all classes concur in the prevention of these destructive and demoralizing collisions, and that the owners of the property, for their own self-protection, will be driven to remove the causes which have produced them. It is idle for them to expend their capital for the best machinery, for the highest skill, for the most economical transportation, unless they can, at the same time, insure a continuous production from a contented laboring population.

This they have it in their power to do. If the same spirit of sacrifice which has sent out our missionaries into every heathen land, had been shown in the coal regions, and the same efforts had been made to establish and maintain the school-house, the church, and above all the Sunday-school, which have borne such fruits elsewhere in this broad land; if the hospital for the sick, and the comfortable refuge for the unfortunate had been carefully provided; if reading-rooms and night-schools, and rational places of amusement had from the outset been maintained for a growing and restless population, the coal regions to-day might have been a paradise upon earth instead of a disgrace to civilization. And here it is that this new power of concentrated management can exert itself with sure and absolute success. The appropriation of a few cents per ton on the coal mined to the work of improving the moral and intellectual conditions of the miners and their families will, in a time incredibly short, change the whole face of society in the coal regions.

To be effective, however, this concentration of a fixed amount on each ton of coal sent to market must be as absolute and final as that portion of the proceeds which is devoted to pumping the mines, or driving the gangways. It must not come from grace, but from a sense of duty involved in the ownership of property, and dictated by a wise regard for its preservation and permanent value. Even if this percentage were added to the price of the coal the addition would not be grudged by the public; but in fact no such addition could possibly occur, as there is no surer way of promoting economy in the cost of production than by improving the social condition, the self-respect, and the intelligence of those who are engaged in the work of production, which thus becomes continuous and systematic. Until the great companies thus recognize the duties, the responsibilities, and the opportunities for good, which are offered by the new social development which has rendered their existence a necessity as well as a possibility, they must not complain that they are regarded with distrust, and as enemies, both by the public which consumes their products, and by the working classes who see in them only grasping employers without a conscience. What individual owners could not do, it is easy for these great companies to put in prac-

tice ; but the effort must be as earnest and serious as is the business of producing the coal and getting it to market. The very best talent must be secured for the organization and management of the various agencies necessary for the moral, intellectual, and social improvement of the working classes, who must be themselves associated in the administration of the fund created and expended for their benefit. Five cents per ton would produce an annual revenue of over \$1,000,000 applicable to this necessary and noble use, and five years of its intelligent and conscientious administration would convert what in some regions has been aptly termed a "hell upon earth" into a terrestrial paradise which would be the pride and the glory of the new world.

What more fitting celebration of the centennial year of American Independence could be possibly suggested or devised, or how could the advent of the incoming century be better signalized, than by the foundation on the part of the great anthracite-coal companies of a new department in their administration for the moral, mental, social, and physical improvement of the workingmen and their families, and by the appropriation of a fixed charge on coal for this purpose? Let each of them select a well-paid and competent agent to devote himself to this work; let the various agencies be wisely organized and surely perfected, and there will be realized one of the greatest triumphs of that gospel which proclaimed "peace on earth and good-will toward men." The example thus set will soon extend itself to other industries, and to every branch of business which can adapt the corporate principle of the concentration of management through diffusion of ownership, the result of which will be that the strange phenomenon, now felt throughout the civilized world, of a general glut of products in the face of general want of them, will never again be witnessed; because, when the working classes, through the diviner agencies of Christian effort, shall have constant employment and adequate compensation, the sure results of general enlightenment and a cultivated conscience in the use of property, the power of consumption, now so far in arrear, will surely overtake the power of production, and re-establish the equation which nature intended to subsist between them. Thus may be realized that Christian commonwealth, which has been the dream of the patriot, the philanthropist, and the statesman in all ages, in which every man who is willing to work shall find employment, and in which the products of industry will be so distributed that every man shall feel that he has received his fair share of them; in which there will be neither abject and hopeless poverty on the one hand, nor superfluous riches on the other, because the problem of how to distribute capital through the concentration of management will have been fully solved and be thoroughly comprehended by all classes in the community; in which the quaint questions put by Sir Thomas More, three hundred and sixty years ago, will at length have been answered, and his suggestive commentary thereon have lost its significance:

"Is not that government both unjust and ungrateful, that is so prodigal of its favors to those that are called gentlemen or goldsmiths, or such others who are idle, or live either by flattery, or by contriving the arts of vain pleasure; and on the other hand takes no care of those of a meaner sort, such as plowmen, colliers, and smiths, without whom it could not subsist?"

"But after the public has reaped all the advantages of their service, and they come to be oppressed with age, sickness, and want, all their labors, and the good they have done is forgotten, and all the recompense given them is, that they are left to die in great misery. The richer sort

are often endeavoring to bring the hire of laborers lower, not only by their fraudulent practices, but by the laws which they procure to be made to this effect, so that though it is a thing most unjust in itself to give such small rewards to those who deserve so well of the public, yet they have given those hardships the name and color of justice, by procuring laws to be made for regulating them."

Although I quote from the Utopia, let it not be supposed that there is anything Utopian or impracticable in the proposition which I have advanced. It seems to me to be the next great step to be taken for the amelioration of the condition of mankind. The law of diffusion which thus far has governed the progress of the human race toward a higher and better plane of civilization, has at length made an effective lodgment in the domain of capital, whereby it is rendered capable of infinite division without impairing, but in effect improving the economy and force of its administration. The reproach that "corporations have no souls," must, and will, next be removed, so soon as the beneficent possibilities inherent in these agencies shall be generally recognized, and those who are called to the management shall see that because capital is aggregated, the primary law on which all property rests, that it is a trust to be administered for the public good, loses none of its force, but can, in reality, only assert itself in all its vigor when concentrated management is brought to bear upon great aggregations of capital. Man did not become a "living soul" until God breathed into him the breath of life. So corporations are mere machines until they are inspired by the associated conscience of society, to which they can give ready and effective expression, and I look for this expression first from the great coal companies, because their property and their peculiar organizations make it easy as well as profitable for them to put in practice the fundamental idea, that a fixed portion of the proceeds of industry should be invariably devoted to the social improvement of those who labor directly for its development.

If the seed here dropped should take root, as I pray and believe it will, then indeed will the country and the world have reason to rejoice at the industrial development of the last hundred years, and the celebration of this Centennial be the dawn of a better day for the patient sons of toil, who, let it be confessed, with all frankness and humility, have not yet been endowed with their fair share of the good things of this goodly earth.

Population of the United States.

[From the United States Census Returns.]

1790.....	3, 929, 214	1840.....	17, 069, 453
1800.....	5, 308, 483	1850.....	23, 191, 876
1810.....	7, 239, 881	1860.....	31, 443, 321
1820.....	9, 633, 822	1870.....	38, 558, 371
1830.....	12, 866, 020		

Table of production of leading metals and minerals in the United States during the first century of National Independence.

[Prepared by R. W. RAYMOND.]

	Anthracite, in tons of 2,240 pounds avoirdupois.	Pig iron, in tons of 2,240 pounds avoirdupois.	Lead, in tons of 2,240 pounds avoirdupois.	Copper, in tons of 2,240 pounds avoirdupois.	Quicksilver, in flasks of 76½ pounds avoi- rduois.	Gold, in dollars, United States coin.	Silver, in dollars, United States coin.	Petroleum, in bar- rels of 42 gal- lons.
1819.....	18,000*							
1820.....	1,965							
1821.....	3,373							
1822.....	4,940							
1823.....	9,023							
1824.....	13,641		4,432*					
1825.....	38,499		1,381					
1826.....	54,815		1,771					
1827.....	71,167	2,178,339*	3,937					
1828.....	91,914	130,000	7,815					
1829.....	133,303	142,000	7,294					
1830.....	209,634	165,000	7,163					
1831.....	230,320	191,000	6,646					
1832.....	448,171	200,000	8,888					
1833.....	592,910	218,000	9,707					
1834.....	456,859	236,000	10,558					
1835.....	678,517	254,000	11,696					
1836.....	825,739	272,000	14,216					
1837.....	1,039,341	290,000	11,994					
1838.....	873,013	308,000	13,519					
1839.....	957,436	326,000	15,539					
1840.....	1,008,390	347,000	15,000					
1841.....	1,115,045	290,000	18,171					
1842.....	1,396,618	230,000	21,598					
1843.....	1,478,998	314,000	21,000					
1844.....	1,899,805	394,000	23,000	2,680*				
1845.....	2,532,984	486,000	28,500	100				
1846.....	2,707,391	765,000	25,000	150				
1847.....	3,397,153	800,000	25,000	300		20,000,000*		
1848.....	3,578,695	800,000	22,500	500		10,000,000		
1849.....	3,794,806	850,000	21,000	700		40,000,000		
1850.....	3,863,365	563,755	19,500	600	25,424*	50,000,000		
1851.....	5,190,690	413,000	16,500	800	24,000	55,000,000		
1852.....	5,725,148	540,755	14,000	1,000	20,000	60,000,000		
1853.....	5,940,905	723,214	15,000	1,850	19,000	65,000,000		
1854.....	6,846,556	662,216	14,000	2,250	27,000	60,000,000		
1855.....	7,684,542	700,159	14,000	3,000	33,000	55,000,000		
1856.....	7,999,767	788,515	14,000	4,000	30,000	55,000,000		
1857.....	7,694,842	712,640	14,000	4,800	28,000	55,000,000		
1858.....	7,664,230	629,552	14,000	5,500	31,000	50,000,000	1,000,000*	
1859.....	9,010,796	750,560	14,000	6,300	13,000	50,000,000	100,000	3,300
1860.....	9,807,113	821,223	14,000	7,200	10,000	46,000,000	150,000	650,000
1861.....	9,147,461	653,164	14,000	7,500	35,000	43,000,000	2,000,000	2,113,600
1862.....	9,026,211	702,912	14,000	9,000	42,000	39,300,000	4,500,000	3,056,606
1863.....	10,953,077	846,075	14,000	6,474	40,531	40,000,000	8,500,000	2,611,859
1864.....	11,631,400	1,013,837	14,000	6,518	47,489	46,100,000	11,000,000	2,116,182
1865.....	10,783,032	831,768	13,165	6,811	53,000	53,300,000	11,250,000	3,497,712
1866.....	14,323,919	1,900,199	14,343	6,978	46,550	53,500,000	10,000,000	3,597,527
1867.....	14,345,644	1,305,015	13,662	7,774	37,000	61,700,000	13,550,000	3,347,306
1868.....	15,810,466	1,431,250	14,636	9,467	37,000	48,000,000	12,000,000	3,715,741
1869.....	16,375,678	1,711,278	15,653	11,858	33,713	49,500,000	13,000,000	4,215,000
1870.....	17,819,700	1,696,429	15,923	12,650	28,546	50,000,000	16,000,000	5,658,604
1871.....	17,370,463	1,707,685	17,854	12,546	31,881	43,500,000	22,000,000	5,795,000
1872.....	23,022,265	2,539,783	23,106	11,948	30,306	36,000,000	25,750,000	6,539,103
1873.....	22,698,178	2,560,962	46,661	15,573	28,600	35,000,000	36,500,000	9,578,455
1874.....	21,667,396	2,401,961	53,219	17,548	34,254	39,600,000	32,800,000	10,910,303
1875.....	20,643,509	2,108,554	53,000	15,625	53,706	33,400,000	41,400,000	8,787,506
Total.....	241,521,423	40,000,000	855,000	900,000	840,800	1,332,700,000	261,450,000	78,594,600

* Including the whole previous period from 1776.

Production of Comstock lode.

1860.....	\$1,000,000	1869.....	\$7,528,607
1861.....	2,275,256	1870.....	8,319,698
1862.....	6,247,047	1871.....	11,053,328
1863.....	12,486,238	1872.....	13,569,724
1864.....	15,795,585	1873.....	21,534,727
1865.....	15,184,877	1874.....	22,400,783
1866.....	14,167,071	1875.....	26,023,036
1867.....	13,738,618		
1868.....	8,499,769		199,824,364

Or, in round numbers, \$200,000,000, of which about \$80,000,000 has been gold and \$120,000,000 silver, according to Mr. J. D. Hague.

CHAPTER XII.

THE BOSTON AND COLORADO SMELTING WORKS.

By T. EGLESTON, PH. D.*

Columbia School of Mines, New York City.

The Boston and Colorado Smelting Works are situated in the town of Black Hawk, Gilpin County, Colorado, on the Clear Creek Narrow Gauge Railway, 55 miles from Denver, in the Rocky Mountains, at an altitude of 7,800 feet. It was one of the first works erected for the metallurgical treatment of gold ores, and the only one established in Colorado on a large scale which has been uniformly successful. Both gold and silver ores are treated, and gold, silver, and copper produced. The lead is not separated from the ores nor paid for, if it exists, and is entirely lost in the residues. The works were planned and built by Professor Hill, formerly professor of chemistry in Brown University, Providence, R. I., and is still managed by him, assisted by Mr. Richard Pearce, formerly professor in the School of Mines at Truro, England. They are very advantageously situated with regard to the ore-producing regions, having Boulder County on the north, which produces, besides ordinary gold ores, a series of tellurium minerals, such as altaite, sylvanite, and hessite, which are very rich in gold and silver. They are associated with copper and iron pyrites, blende, galena, and the carbonate and oxides of iron. Gilpin County itself produces for the most part the pyrites of iron and copper, rich in gold, with a small quantity of galena and blende, which is rich in silver. In some mines native gold is found. Clear Creek County to the south furnishes mostly galena and blende, very rich in silver. The works also receive mattes rich in gold and silver made at Alma, in Park County, and tellurium ores, rich in gold, from the southern part of the Territory.

The works are thus located in the very center of the gold and silver producing regions of Colorado, and are also most favorably situated with regard to transportation. They treated in 1874 30 tons of ore and tailings in 24 hours, and produced 700,000 ounces of silver, 12,000 ounces to 15,000 ounces of gold, and 225 tons of copper. With matte from Alma, their production in 1875 will be 110,000 ounces of silver, 25,000 ounces of gold, and 250 tons of copper.

Gold ores.—The gold ores are divided into three classes. The first class consists of auriferous copper pyrites containing from 2 to 10 per cent. of copper, 2 ounces to 10 ounces of gold, and 2 ounces to 10 ounces of silver. These ores average 4 per cent. of copper, $3\frac{1}{2}$ ounces of gold, and 6 ounces of silver. The second class are tailings from the gold

* This chapter was prepared by Professor Egleston as a paper for the American Institute of Mining Engineers, and a duplicate copy was furnished to me for this report, it being anticipated that the report would be printed before the Transactions of the Institute.—R. W. R.

mills, consisting of pyrites with about $1\frac{1}{2}$ per cent. of copper, $1\frac{1}{2}$ ounces of gold, and 4 ounces of silver. The third class consists of tellurium ores, which have a very siliceous gangue, and contain 100 ounces to 200 ounces of gold, and 6 ounces to 10 ounces of silver. These ores come mostly from Boulder County, and are often worth \$10,000 to \$15,000 to the ton.

Silver ores.—The silver ores of the first class consist of surface-ores, mostly free from sulphur, containing 70 per cent. of silica. They contain 100 ounces of silver and 5 to 6 per cent. of lead, and no gold. Those of the second class are sulphurets, rich in blende and poor in galena and pyrites; they contain 150 ounces of silver, 15 per cent. of zinc and lead, and no gold.

The cost of material at the works is:

Wood, per cord.....	\$5 00
Fire-brick, per thousand.....	90 00
Common brick, per thousand.....	14 00
Iron castings, per pound.....	08
Wrought iron, per pound.....	08

The cost of delivering the silver in New York is $1\frac{1}{2}$ per cent. of its assay value, taken at the valuation of the works. The rate for gold is six-tenths per cent.

The general plan of these works is given in Fig. 1, Plate I. The diagram, Fig. 1*, indicates the various processes, showing what becomes of each of the products in the different stages. The treatment consists of eight distinct operations, most of which are more or less subdivided. These operations are:

1. Sampling the ore.
2. Roasting the ore.
 - A. Large ore roasted in heaps.
 - B. Small ore roasted in a reverberatory furnace.
3. Fusion for matte.
4. Ziervogel's process.
 - A. Crushing and roasting the matte for sulphate of silver.
 - B. Leaching the roasted matte and precipitation of the silver.
 - C. Washing and fusing the cement silver.
 - D. Precipitating the copper.
 - E. Refining cement copper.
5. Treatment of the Ziervogel tub residues.
 - A. Fusion for white metal.
 - B. Roasting the white metal.
 - C. Treatment of the pimple metal.
6. Treatment of the residues of the Ziervogel process by the Augustine process.
7. Treatment of the bottoms.
8. Treatment of the oxidized copper alloy.

I.—SAMPLING THE ORE.

The ore is purchased in large and small sample lots varying from 50 pounds to 6 tons or 7 tons. It is sampled by first taking one-tenth of the lot and putting it through a crusher* and a pair of Cornish rolls, and then sampling as usual. When the ores are sent by the owner for treatment the charge formerly was:

For ores containing \$50,	\$35
" " 60,	36
" " 70,	37
" " 80,	38
" " 100,	40
" " 200,	50
" " 300,	60

and so on.

* Dodge's crusher is used in these works, and to some extent in Colorado, though Blake's crusher is preferred where there is a large and constant amount of work to do.

The arrangement of July, 1874, was that the company should pay for gold-ores at the rate of 85 per cent. of the total value of the gold and silver contained (premium added) after deducting \$35 per ton currency for treatment. The gold is estimated at \$20 gold per ounce, and the silver at \$1.25 gold per ounce, with the premium added, 3 per cent. below New York quotations.

The arrangement for silver at the same time is given in the table below. The prices are based on the premium on gold in New York, ranging between \$1.10 and \$1.15.

For ores containing	40 oz. per ton,	34 cents per oz. in currency.
"	50	44
"	60	52
"	70	60
"	80	66
"	90	70
"	100	74
"	125	82
"	150	89
"	175	93
"	200	97
"	250	99
"	300	101
"	350	103
"	400	105
"	450	106
"	500	107
"	600	108
"	700	109
"	800	110
"	900	111
"	1,000	112
"	2,000	116

The copper is paid for at \$1.50 currency for each unit by the dry Cornish assay. The prices given in Georgetown differ slightly from this. Below are given the prices of two different works as they were advertised in July, 1874.

Prices given for silver by W. Bement, Georgetown.

Ounces of silver per ton.	Price per ounce of silver for ores containing from 5 to 10 per cent. of zinc.	Price per ounce of silver for ores free from zinc, or containing less than 5 per cent.
	Cents.	Cents.
75 to 100	48	50
100 to 125	55	60
125 to 150	65	70
150 to 175	75	80
175 to 200	82	84
200 to 250	85	88
250 to 300	90	92
300 to 350	93	94
350 to 400	96	98
400 to 450	99	100
450 to 500	102	103
500 to 550	104	105
550 to 600	106	107
600 to 700	107	108
700 to 900		109
1,000 and upward		110

At Stewart's Mill, Georgetown, the following prices were paid :

Ore containing	Ounces.	Cents.		
	299 silver or less,	105 for each oz.; over 35 oz. no deduction.		
"	300	"	94	"
"	325	"	95	"
"	350	"	96	"
"	375	"	97	"
"	400	"	98	"
"	450	"	99	"
"	500	"	100	"
"	550	"	101	"
"	600	"	102	"
"	650	"	103	"
"	700	"	104	"
"	750	"	105	"
"	800	"	106	"
"	850	"	107	"
"	900	"	108	"
"	1,000	"	110	"
"	2,000	"	112	"

The precious metals in the ores were formerly never paid for above a certain minimum, which for silver was 40 ounces, and for gold $1\frac{1}{2}$ ounces. All above this minimum was paid for in currency at the rate of 85 per cent. of its bullion value. For all copper above 2 per cent., \$1.50 currency was given for each unit.

All the ores received are piled separately on the sampling-ground. All the large pieces of gold ore are roasted in heaps, and are then passed through a crusher and rolls, and afterward through a screen with four to the inch mesh. The tellurium-ores are only crushed and passed through a ten to the inch mesh screen, and are then ready for smelting. The surface silver-ores are crushed and passed through a four to the inch mesh screen, and then go to the furnace. The ores rich in sulphur are called heavy ores, and are crushed and roasted in a large reverberatory furnace.

II.—ROASTING THE ORES.

A. Roasting ores in heaps.—The auriferous pyrites is broken to 2 inches square in a crusher and roasted in heaps of about 50 tons each. The piles are made in the usual way, with a wooden chimney about 7 feet high in the center. Wood is used as fuel. The amount consumed is two cords for 50 tons. The wood is burned out in about twelve hours, at which time the sulphur commences to burn. The pile is lighted at night, because the moisture in the fuel makes sulphureted hydrogen, which would annoy the men in the day-time. The fire, except in case of accident, burns until the roasting is complete. The sampler takes charge of the piles. He has little to do except to throw fine ore on the cover when he sees that there is too much flame. He has two or three assistants, and with them he does all the weighing and sampling, and takes care of the piles. When the pile is finished the outside crust of unburned pyrites is taken off and put onto the next pile. The roasted ore is crushed and goes through a sieve with a four to the inch mesh, and is then ready for the smelter. One man does the whole crushing. The roasting is finished in about six weeks from the time the fire is lit. The amount of sulphur remaining in the ore is 4 per cent. As the ores contain considerable arsenic the pile is frequently covered on the outside with crystals of arsenious acid, which are often white, but generally colored with a slight trace of sulphur. They are generally found when there has been

a hole in the cover of the pile, and their usual form is that of an octahedron with hollow faces.

B. Roasting the ore in a reverberatory furnace.—The ore submitted to this process is said to be calcined.* The tailings and finely-divided copper-ores are roasted in a reverberatory furnace, called a calciner, till they contain not more than one-half to 4 per cent. of sulphur. There are six of these calciners in the works. They are marked K on the ground-plan, and are shown in detail at Figs. 2, 3, and 4, Plate I. Only three of them are in use at a time; two of these work into the same flue. The total length of the furnace is 40 feet on the outside, including the fire-place. Each furnace has three step-hearths, 10 feet long; they are 11 feet wide, and have six working doors, two doors to each hearth. The hearths are $4\frac{1}{2}$ inches, the one above the other, and are equally divided in the length of the furnace. Each one is rectangular, with the usual waste space at the doors filled up. The two at the end have their corners rounded.

On comparing the relative dimensions of these furnaces, it will be seen that the surface of the hearth is 304 square feet. The surface of the grate is 16 square feet. If the fire-place is taken as unity, the relation between the surfaces will be as 1 to 19.

The fire-place is arranged for long sticks of wood, and has a door at the side. It is 5 feet long and 2 feet 8 inches wide. The bridge has an air-hole in it which is $4\frac{1}{2}$ inches square, and communicates with the interior of the hearth by four openings. The width of the bridge is 28 inches, the height of the roof above the hearth is 28 inches, and at the flue-end it is 18 inches.

The furnace is built of red brick, fire-brick being used only in the fire-place and on the first hearth. A charge of one ton is introduced on the hearth nearest the flue, so that there are three tons in the furnace at a time. The charge of ore on each hearth, spread out after being first put in, is 3 inches deep, but it swells, so as to be 4 inches to 5 inches in depth on the hearth nearest the fire-place; this is particularly true of the tailings. As the charge is drawn once in eight hours, it takes twenty-four hours to complete the roasting of one ton of ore. One man to a shift, who brings his own wood, is all the labor that is required, so that two men work three tons in twenty-four hours. The ore is brought to the furnace-men, who then make the charge. One man brings all the ore for three furnaces. The men from the calciners always assist in charging the calcined ores into the matte-furnaces. The furnace burns $1\frac{1}{2}$ cords in twenty-four hours. One day in a year only is required for necessary repairs.

III.—FUSION FOR MATTE.

The roasted ore is fused in a reverberatory furnace for matte. There are three of these furnaces, which are marked D in the ground-plan, Fig. 1, and are given in detail in Figs. 5, 6, 7, and 8, Plate I. Only two of them are in use at a time. They are constructed to use wood, so that the fire-place, which is 5 feet at the top of the bridge, is only 2 feet 6 inches at the grate; it is 5 feet long, and 4 feet 6 inches deep from the grate to the roof. The opening in the fire-place for charging fuel is at the end of the furnace, and not at the side, as is usual. The fire-place door is of cast-iron; it slides in a groove, and is counterpoised with a

*The word "calcining," as used in these works, means treating the ores or mattes in a fine state in an oxidizing atmosphere. The term "roasting" means the treatment of metal ingots or mattes in large pieces in an oxidizing atmosphere. As these words are not used properly in a metallurgical sense, we shall speak of both as roasting.

weight. The bridge is 2 feet 6 inches wide, the fire-place side is 2 feet 3 inches, and the laboratory side 1 foot 10 inches from the roof. Just above the bridge there are a series of openings in the roof, 3 inches by 1 inch, for the admission of air, which follow on the roof the contour of the laboratory in two rows, the outside having eight and the interior eleven holes each. The laboratory is 15 feet $7\frac{1}{2}$ inches long by 9 feet 9 inches wide. The working door is at the end; the two openings at the side are closed for this operation.

In comparing the relative dimensions of the furnace, we find that the surface of the fire-place at the height of the bridge is 25 square feet, that at the grate is $12\frac{1}{2}$ square feet. The laboratory has 143.18 square feet, so that the fire-place being taken as one, the relation is as 1 to 5.7.*

Each one of these furnaces has its own chimney, which is 50 feet high. The arrangement of the holes in the roof is a very ingenious one, for as the fire-place is very deep, and is constantly filled with long sticks of wood to a depth of over 3 feet, the wood distills and forms gas, which is burned by the air entering through these holes, so that the fire-place is really a generator for burning wood. Before this method was introduced by Professor Pearce there was not sufficient air to produce a perfect combustion. Formerly the flue connected with the chimney was constantly burning out, and needed frequent repairs. The immediate effect of the introduction of these holes in the roof was the saving of fuel and more equal distribution of heat. An opening has recently been made in the foot of the chimney for the introduction of cold air, and both because the combustion is better regulated and because the cold air is mixed with the products of combustion on leaving the furnace, the repairs to the furnace are very much diminished.

The hearth of the furnace is slightly inclined toward the working door and also to one side. It is made of two layers of brick, upon which fine quartz-sand is placed, which is mixed with a small quantity of wood-ashes and then agglomerated. When the hearth is made the temperature is lowered, and the charge is introduced. The charge is made up of—

	Pounds.
Heap-roasted gold-ores.....	2,000
Roasted tailings.....	2,000
Oxidized silver-ores.....	1,500
Roasted silver-ores.....	1,500
Raw pyrites.....	800
Fluor spar.....	250
Rich scoriae.....	500

After the charge is drawn, the furnace is repaired, if necessary, with clay, which is beaten in with a ladle-shaped instrument attached to a long handle. Such repairs are usually not made oftener than twice a week. The charge is introduced with a shovel by a side door. The ore is introduced first and then the rich slags. The charge is so arranged that ten tons of mixed ores will produce one ton of matte. It will not do to make the matte richer, as there are always grains of it in the slag, and the loss would be greater. The slag is carefully calculated, so that it shall not be too basic, or otherwise it would cut the fire-brick to get silica. The charge is evenly distributed over the surface of the hearth, which is almost at a cherry-red heat. It takes six men, working in groups of three at a time, nearly a quarter of an hour to make the charge. As soon as it is made, the charging door is built up and luted or closed

* In all these fire-places with inclined sides, the surface taken as unity is the section at the bridge. As the grate-surface is smaller, the relation between the grate and fire-place surfaces should also be given.

with sand. The fire-place is then charged, and the furnace is left with the full power of the draft for five or six hours. During this time the workmen clean up the slag-bed and tend to the fire, which requires looking after every twenty minutes. At the end of this time they stir the furnace carefully five or six minutes to bring up everything from the bottom, which should be perfectly smooth to the tool passing over it. This produces the reactions. The furnace is now left in repose for twenty minutes to effect the separation of the scoria and the matte. If lumps are found the stirring is done again, and kept up during the firing, or for about an hour. The slag is now drawn with a rabble into molds prepared for it. The operation of skimming the slag takes about twenty minutes. When the door is opened to skim the slag it is quite hot and fluid, and there is a constant but quiet ebullition of sulphurous and sulphuric acid, the bubbles being about 1 inch in diameter and quite uniformly distributed. Professor Pearce asserts that the larger part of the gas is sulphuric acid. At the close of the skimming, as the slag becomes cooler, the bubbles become larger and less uniform. Just before the skimming, pieces of sheet-iron, 3 feet by 2 feet, are placed in front of the slag-bed and to one side of it, to protect the workmen from the heat. The casting-bed is made 10 inches deep in front of the furnace to receive the plate-slag, which ordinarily contains all the grains of matte. This casting-bed has fourteen divisions, which are connected one with the other. When the slag, which covers the matte to the depth of about 3 inches, is being skimmed, it is very easy to distinguish the matte below, which shows of a dark color and a more or less brilliant surface. As the rabble goes backward and forward, the slag does not close at once over it, and the surface is exposed for a very short time. When all the slag is drawn off, a new charge of ore is introduced. Four charges are made in twenty-four hours. During each one of the operations the stirring and rabbling are conducted in exactly the same way. While the slag is tapped the matte is left to accumulate, and is tapped only once in twenty-four hours. When the matte is to be tapped, all the doors of the furnace are to be opened so as to chill the last part of the slag a little, so that it will not flow out from the tap-hole. It is then tapped and made into plates 3 feet long, 14 inches wide, and 4 inches thick in the middle, the bottom being rounded. No slag flows out with it, because it is too much chilled. When all the matte has been tapped, the tap-hole is closed with damp sand. The charge makes about 14 plates. The operation of tapping the matte and stirring takes half an hour. Three men per shift of 12 hours are required to work two furnaces. Eight cords of wood are consumed in 24 hours. The plate-slag contains on an average 5 per cent. of copper, but is often poor enough to be thrown away with the other slags. It is generally a silicate of protoxide of iron, but is sometimes more basic. The poor slag contains about 7 ounces of silver and a trace of gold. It is too poor to treat, and is thrown away. All the slag richer than this is put back into the furnace. The matte contains from 25 to 30 per cent. of copper, 20 ounces to 30 ounces of gold, 600 ounces to 1,000 ounces of silver, and some iron, lead, zinc, and antimony. When the hearth-bottom of the matte-furnace becomes loose and rises, as it sometimes does, the whole hearth material is taken out, crushed, and treated as ore. The flues of the furnace have to be repaired every two or three months. The roof is made over once a year. The outside walls last a number of years before it is necessary to rebuild the furnace. There are produced from this fusion the copper matte, which passes to the next operation, the plate-slag, which is immediately put back into the furnace, and the poor slag, which is thrown away.

IV.—ZIERVOGEL'S PROCESS.

A. *Crushing and roasting matte for sulphate of silver.*—The matte produced from the previous operation must be roasted, and for this purpose it must be crushed fine. It is first broken up with sledges and then crushed in a Dodge crusher, with which one man can crush about 10 tons in a day. After crushing it is put through a twelve to the inch screen, and is then wheeled in a wooden barrow to the calciners, marked K on the general plan, where it is roasted for twenty-four hours, a charge being drawn every eight hours. The charge is 1 ton on each hearth, so that there are 3 tons in the furnace at a time. One furnace working constantly does the whole work of the establishment; 90 per cent. of the sulphur is removed in this operation. The roasted matte contains about 5 per cent. sulphur, partly as sulphides and partly as sulphates. Where the matte is charged on the hearth the furnace is dark. This is necessary to prevent fusion, as there must be rapid oxidation at the lowest possible temperature. When the workman is not attending to the fire he is always rabbling the charge. When the charge on one hearth is finished it is moved to the next one by a spaddelle. On the middle hearth the heat is very dull, and from this temperature it is gradually raised until it is withdrawn from the furnace; on the last hearth the temperature is a bright cherry-red heat. The charge is drawn with a rabble into a "cub" beside the furnace. As there is but a small amount of sulphurous acid given off, the roasted matte remains here until it is cool enough to be wheeled in wooden barrows, when it is taken to the ball pulverizer. One and a half cords of wood in twenty-four hours is all the fuel used in this operation.

The ball pulverizer consists of a stationary horizontal sheet-iron cylinder 4 feet in length and 2 feet 8 inches in diameter, inside of which another cylinder of less diameter revolves. This inside cylinder is made with a cast-iron head-piece, into which cast-iron bars are fitted so as to leave a space $\frac{1}{4}$ th of an inch between them. These bars are kept in position by a flange and wedges, and the heads are then securely bolted together. The material to be ground is introduced into the revolving cylinder through a trough in its axis. This cylinder or grinder contains one-half ton of iron balls, which when new are 3 inches in diameter.

The cold calcined ore from the cubs is thrown on to the crusher-floor, and shoveled into bins, from which it is carried by an endless chain to a hopper which communicates with the charging-trough. The charge and balls revolve together at the rate of 37 revolutions per minute. The ore which is ground sufficiently fine, passes through the spaces between the bars and falls into the stationary cylinder, which is hopper-shaped at the bottom, and communicates with a trough, through which an endless chain passes and carries the ore to a 60-mesh screen; what remains on this screen is carried back again to the grinder. The crusher works between 3 tons and 4 tons in twenty-four hours, and has besides plenty of time for the necessary stoppages for repairs. Six tons might easily be put through in ten hours, but from 3 tons to 4 tons is all that is required, so that a single crusher is more than sufficient. Very few repairs are done to the machinery. The bars wear, and when the openings become too wide new bars are put in. Not more than 500 pounds of balls are worn out in the course of a year. The men who do this work are obliged to wear wet sponges over their mouths in order to protect themselves from the dust. One man, who also carries the wood to the calciners, brings the ore, and one man who shovels the ore and tends the grinder, are all that are required for the work.

Roasting for sulphate of silver.—From the ball-grinder screens the ground matte is deposited in a bin ready to be roasted for sulphate of silver. The furnace in which this operation is conducted is called the fine calciner. There are two of them, marked B B in the general plan, Fig. 1, Plate I, and Fig. 12, Plate II. The furnaces are shown in detail in Figs. 9, 10, and 11, Plate II. They connect with four small dust-chambers, which are common to both furnaces and connect with the same chimney. They are constantly in use except when silver is being melted, when only one of them is run. They have but one hearth, which is 11 feet 6 inches long, 3 feet 6 inches deep, and 10 feet 6 inches wide. This hearth is flat. The fire-place is 4 feet 6 inches long, 2 feet 6 inches wide at the bridge. The grate is only 1 foot wide. There are 11.25 square feet surface in the fire-place, and 100 square feet in the laboratory, making the relation as 1:9. The top of the bridge is 8 inches from the roof. The bridge is 2 feet wide, but 14 inches of this width is a curtain arch, the bottom of which is 16 inches above the hearth. Just beyond the curtain in the roof of the furnace there are a series of holes for the admission of air, of the same size as in the matte-furnace. The first line goes straight across the roof, and is composed of five holes. The second follows the contour of the furnace and is composed of nine holes. The hearth of this furnace is made of a bed of old slag or stone covered with sand. On these, bricks placed on end and laid in cement are placed, which form the hearth proper.

The charge is 1,600 pounds of roasted crushed matte, which is thrown in with a shovel and made into a pile on the center of the hearth. Just before it is introduced all the dampers are closed. The hearth of the furnace at this time is dark. The fire-place is, however, glowing, but contains only embers, just sufficient to keep it hot. As soon as the charge is introduced it is leveled with the rabble and spread out over the hearth. When spread out it is about 3 inches thick. It takes about 20 minutes to do this work, during which time the dampers remain closed and no fuel is put into the fire-place. As soon as the charge is completed the damper is slightly raised, but no fuel is charged. In about an hour the charge has a dull, blackish glow. The surface looks black, but it is red when stirred. The fire-place is now charged with a small amount of fuel, and the temperature gradually raised so as to keep it at about a dull-red heat, but raising it slightly. The fire-place door is closed. The supply of air comes from the bridge holes, the working door, and the grate. The work at this stage consists of forming a maximum amount of sulphate of iron and some sulphate of copper, but the silver remains unchanged. The fumes of sulphuric acid commence to be given off from the decomposition of the persulphate of iron, and the charge increases in volume, becoming spongy. As the furnace-door is open the workman is exposed to the acid fumes, and is, therefore, obliged to wear a respirator. The stirring is kept up and the heat gradually increased. From the second hour the grate is kept full until the end of the operation, the temperature being kept as uniform as possible. The ash-pit door is closed after the first hour, the air entering only through the working door and the holes in the bridge. The flame over the curtain arch is curly, blackish, and reducing, but as there is more than 14 inches between it and the charge below, and the working door is constantly opened, it is so fully mixed with air, that in contact with the charge it is oxidizing. At the end of this time the heat is at its maximum, and the charge becomes dry, no longer sticking to the rabble. At this point, which is at the end of three hours, the sulphate of silver is formed. The sulphate of iron is decomposed at the end of two hours. The sulphate of copper, at the

time all the iron is decomposed, is at its maximum, which is at the end of the third hour. When the silver is "out" a bar 2 inches square and 14 feet long is used to break up any lumps. The charge is collected with it into the middle hearth. The pile is then, by a sliding motion of the bar on its side, cut down, bruised, stamped, and broken up, and in this way turned over twice from one side of the furnace to the other. In order to facilitate this work, the front of the working door is provided with a roller, on which the bar rests. The whole charge by this means is ground fine and all the lumps broken up, and a perfect oxidation secured. It is essential to have as little sulphate of copper as possible, but about $1\frac{1}{2}$ per cent. is left so as to be sure that no sulphate of silver is decomposed. This operation with the bar lasts one hour, so that at the end of four hours the charge is ready to be withdrawn. At the end of the third hour assays commence to be made, and samples are constantly taken until the end of the operation. The first assay generally shows that the sulphate of silver is free, but it is reduced almost instantly to a metallic state by the suboxide of copper present, and spangles are formed which scintillate and sparkle, forming a most beautiful reaction. To make the assay, a sample of the hot charge is simply thrown into cold water in a small dish. The heat of the ore is so great that the temperature of the water is raised to boiling. Whatever silver is in the state of sulphate is dissolved by the boiling water. If there is any suboxide of copper present, the spangle reaction takes place. At the end of the fourth hour the exposure of the surfaces to oxidation from the action of the bar has converted all the copper from suboxide into protoxide, and no spangles are seen in the assay. The sulphate of silver consequently remains permanent. If any sulphide of silver was present in the charge, it is attacked by the sulphuric acid given off by the decomposing sulphates and converted into sulphate. An average of from 90 to 95 per cent. of silver is thus rendered soluble, the rest being in a condition of arsenides, antimonides, or as fine particles within the sulphate of lead, and is not decomposed. The charges are constantly assayed, and the workmen, as they are skilled men, feel it for their interest to conduct the operation properly. It would not be safe to decompose the whole of the sulphate of copper, since there would be danger that some of the sulphate of silver would be decomposed and pass into the residues. The copper gives a blue color to the solution, so that when the spangles are no longer produced, and the liquor is a very pale blue color, the charge is drawn. None of this work is done at night, as the operation is an exceedingly delicate one and requires to be constantly watched. As soon as the charge is withdrawn, the furnace is cooled by opening the doors and dampers to get ready for another charge. Only two charges a day are made. It takes about ten minutes to discharge the furnace. The charge is drawn with a rabble into an iron barrow, and is wheeled to the brick cooling-floor shown at B' in the general plan, Figs. 1 and 12. Each furnace is tended by one man only. The two furnaces burn together $1\frac{1}{2}$ cords of wood in twelve hours; they require only one day's repair in a year.

B. Leaching the sulphate of silver.—The charge from the sulphate of silver furnace is allowed to remain for twelve hours on the cooling-floor and is then leached in tubs. These tubs are 3 feet high, 3 feet in diameter at the top, and 2 feet 6 inches at the bottom (see *m*, in the general plan, Figs. 1 and 12, and Figs. 13, 14, and 15, Plate II). They are provided with a double-bottom, pierced with holes, which is covered with a cloth filter. They are charged with 1,500 pounds of the matte which has been roasted for sulphate of silver. The leaching is done by a current

of boiling water kept hot by steam. The tubs are kept constantly full and discharged into a series of tanks below. It takes eight or nine hours to leach the charge; at first it is light, but in about an hour it shrinks and the water passes less freely through it.

The residues in the tubs contain all the gold and some silver which has not been separated. They are taken out and put on one side to be treated by the Augustine process to separate the silver, and the residues are afterward treated for gold. All the sulphate of copper is dissolved out in the first stages of the work. In about seven or eight hours, assays of the liquid are made and the hot water stopped, when salt added to it shows no trace of silver. The time required varies according to the richness of the matte. Between 600 pounds and 700 pounds are leached in eight hours; generally about an hour is required for every hundred ounces of silver contained in the matte.

Precipitating the silver.—The hot water charged with the sulphates of silver and copper from the solution-tubs is run into a series of vats, *Sg*, shown in Fig. 12, and Figs. 13, 14, and 15, Plate II, and on the general plan, Fig. 1 at S. These vats are 12 feet long, 4 feet wide, and 2 feet 3 inches deep. Two sets of these vats, one in front of the other, are placed before each series of tubs. Each of them is divided into ten compartments, which are 24 inches by 20 inches and 27 inches deep. The liquid is discharged from the tubs into number one and communicates with number two at the bottom. The partition between two and three is low at the top, so that the liquid overflows into three, which communicates with four at the bottom, and so on. At ten the overflow passes into the tank below and follows the same circuitous course. Each compartment in the tanks is filled, as shown in Fig. 15, with plates of copper $\frac{1}{2}$ inch thick and 14 inches by 12 inches in size. Twenty of these plates, each having a precipitating surface of nearly 400 square inches, are placed in each compartment. In the bottom of the tank the plates are placed upright and are slightly inclined, being separated from each other by small strips of wood at the top. Over these the plates are laid horizontally, with strips of wood between each to prevent actual contact. This arrangement gives about 100,000 square inches of precipitating surface to each system. Both series of tanks are filled with copper in the same way. The tanks are kept perfectly covered with wooden covers. At the end of a week they are removed, and the copper plates shaken and washed in the liquid, to remove the silver sponge, which falls to the bottom and is taken out. This sponge is very light, and adheres very slightly to the copper. After the copper plates are taken out the liquid is allowed to settle.

The copper solution is drawn into the tanks *m*, and the silver carried to the tubs *b*, to be washed to remove any traces of copper. It takes about two hours to get the tanks ready for another charge. More than half of the silver is deposited in the first four compartments. Here the copper-plates last about four months. In the other compartments they last twelve months. The amount of copper dissolved is equivalent to the quantity of sulphuric acid set free from its combination with the silver.

C. Washing and fusing the cement silver.—The cement silver is washed in a washer invented by Professor Pearce, and patented in England about eight years ago. It is a tub about 4 feet high and 4 feet in diameter at the top, and 2 feet at the bottom. It is, however, sometimes made a little smaller, being 42 inches high, 40 inches in diameter at the top, and 23 inches at the bottom. This tub, with its injector, is shown on the general plans, Figs. 1 and 12, at *b*, in Figs. 13, 14, and 15, and in

detail at Figs. 16 and 17, Plate II. Two of these washers are placed on a raised platform having a spout connecting with the sulphate of copper tanks. About 3,000 ounces of silver are placed on the false bottom of the tub. A mixture of one part of sulphuric acid to 100 parts of water is then poured in, in sufficient quantity to cover all the silver. Steam at a pressure of 50 pounds is then turned on through the injector, and the arm *a* moved so as to open the air-holes. The steam and air pass down through the false bottom and up through the silver and sulphuric acid. A very violent ebullition is caused in the liquid by this passage of the air and steam.

The silver is thus kept in constant agitation, and fresh surfaces are continually exposed to the action of the acid. Beside this mechanical effect the current of air oxidizes the metallic copper and transforms it, together with the suboxide, into sulphate.* The cement silver from the tanks still contains some traces of copper, as sulphate, and some metallic copper detached from the plates. At the end of two or three hours the liquid is run off through the spout into the tanks. The silver is washed for half an hour with clean water and steam, and then removed in buckets to be dried on top of the drying furnace, Figs. 18 and 19, Plate II. It requires from three to three and a half hours to completely purify the 3,000 ounces of cement silver. After drying, the silver is melted in graphite crucibles in the furnace, Figs. 20, 21, and 22, Plate III. It is cast into bars in the iron ingot mould, Fig 23, and is found to be 999 to 999.5 fine.

D. Precipitation of the copper.—The copper solution from the tanks *gS* runs into the tanks *n*, Fig. 12, which are divided into compartments like the tanks *gS*, and are also covered. These compartments are filled with scrap-iron, which is simply thrown in without any special care in piling. The spent liquor, which is sulphate of iron, when sulphureted hydrogen or a polished-steel plate shows no trace of copper, is discharged into the stream; the velocity of the discharge being regulated according as the action is quick or slow. The copper precipitates on the iron, and is left to accumulate. The compartments are cleaned out about once a month. The copper is removed from the iron by simply moving it backward and forward in the liquid. The iron so cleaned is at once placed in an empty tank to be used on a fresh charge. All the iron used is old scrap-iron, and is therefore not weighed. About 5,000 pounds to 6,000 pounds is used in each tank. The cement copper is allowed to drain and dry, and is then taken to the smelting furnace. It contains about 90 per cent. of metallic copper when it is fresh. The small amount of impurity is owing to the fact that the tanks are closed, thus preventing the precipitation of insoluble compounds of iron. The cement copper oxidizes very rapidly in contact with the air, so that when ready for the furnace it does not contain more than 80 per cent. of copper in the metallic state.

E. Refining the cement copper.—The furnace in which the cement copper is refined is shown at A in the ground-plan, Fig. 1, and in detail by Figs. 24 to 29, Plate III. The fire-place is 5 feet long and 28 inches wide at the top of grate. The grate has the same length, but is only 17 inches wide. The bridge is 2 feet wide. The laboratory is 6 feet 4 inches long and 4 feet 4 inches wide, and has two doors, one at the end, which is the charging door, and one at the side, which is the working door. Just over the bridge in the roof there are two rows of six openings each for the introduction of air; these are covered with a hood to prevent the

* This injector is also used in parting the rich auriferous copper alloy, for the separation of gold, and manufacture of sulphate of copper.

introduction of foreign substances. The furnace connects with the chimney by a flue, which is 2 feet square.

The fire-place has 11.65 square feet and the laboratory 21.79 square feet, so that the relation between them is nearly 1 : 2.

This furnace runs once a month for eighteen or nineteen hours. A charge of 2,500 pounds of copper mixed with 50 pounds of refuse charcoal is put in at 6 p. m. The fireman keeps up the fire during the night, and the refiner takes it at 7 a. m., and then skims off the slag and exposes the surface of the bath. Considerable sulphurous acid is given off, probably from the reduction of the sulphate of iron in the cement copper. The charge is worked for a "set," which takes three to four hours. This is done by striking the surface with the rabble and making waves. This is called beating the copper. The copper produced contains from 2 to 3 per cent. of oxide of copper dissolved in it, but it is not necessary to refine it completely, as it is used at once in the tanks G. The copper is taken from the furnace with a ladle, and is poured into a cast-iron mold made of a frame in two parts, held together by clamps, and is slightly tapering, being larger at the bottom than the top. This frame is placed on a cast-iron plate 3 inches in thickness. The ladleful of copper poured in is allowed to set, that is, a film of suboxide of copper is allowed to form, another ladle is poured on, and so on until the mold is full. The cast-iron frame is then removed, and the plates fall out separately, as the oxide prevents anything more than contact. Twenty-five plates are made in this way at a time.

V.—TREATMENT OF THE ZIERVOGEL TUB RESIDUES.

A. Fusion for white metal.—The residues from the tubs consist of oxides of copper and iron with 20 or 30 ounces of gold and 40 ounces of silver to the ton. They amount to about 22 tons a week. They are melted in the matte-furnace, Figs. 5 to 8, Plate VII, with rich gold-ores of the first class, containing iron with copper pyrites, and variable quantities of gangue, and highly siliceous tellurium ores. All the siliceous pyritiferous ores are selected for this purpose. The ores are all crushed and put through a four to the inch mesh sieve. The charge is brought to the furnace in alternate barrows of residues and ore, but it is not mixed before charging, as it becomes mixed after it is thrown into the furnace. The charge consists of—

	Pounds.
Tub residues.....	4,000
Raw gold-ores of the first class.....	2,500
Gold-ores of the third class.....	900
Total.....	7,400

When there are no tellurium-ores the charge of gold-ores of the first class is made to amount to 3,400 pounds. The treatment is exactly the same as before. A poor slag containing only two ounces of silver and a trace of gold is produced; it is very much poorer than those of the previous fusion. It has otherwise very nearly the same composition as the others, but there is no zinc, either as blende or oxide, in it. The matte contains:

Copper.....	60 per cent.
Gold.....	55 ounces.
Silver.....	130 ounces.
Sulphur.....	30 per cent.

It is called white metal. If the matte was made richer in copper the slag would also be richer, and there would be more loss. The tapping is made twice in twenty-four hours. In other respects the labor, fuel, &c., are the same as in the matte-fusion No. 3. This fusion for the treatment

of tub-residues takes place once a month and lasts a week. All the plate-slag produced during this operation is put directly back into the furnace.

B. Roasting the white metal.—At the end of a week all the mattes produced are recharged in large lumps, the charge being about 4 tons. It is roasted at a dull-red heat for about ten hours with admission of air. The reaction which takes place between the sulphide and oxide makes a peculiar noise, which can be heard at some distance from the furnace. The operation is termed "roasting" for black copper, but it is stopped half-way. As the sulphur is driven off some metallic copper is liberated.

The slag is very thick, and not more than 200 pounds to 300 pounds are produced. It contains from 8 to 10 per cent. of copper, and is highly basic, often containing crystals of magnetite. At the end of the ninth hour the doors are closed and the fire-place charged. The whole furnace is brought to a white heat, so that the whole charge is in intimate fusion. Just before tapping it is rabbled for five minutes, and then tapped into sand-molds. The tapping is done as before, but molds are made to receive the matte, as the charge is greater. In the first three or four pigs there will be found plates or bottoms of metallic copper containing arsenic, antimony, and lead. These bottoms contain nearly the whole of the gold, with a small quantity of silver, from 3 to 5 per cent. of sulphur, and 80 per cent. of copper. The matte is pimple metal, and contains about

Copper	75 per cent.
Gold	2 ounces.
Silver	140 ounces.

From every charge about 600 pounds of bottoms and 3 tons of matte are produced. This bottom fusion takes three days, making ten days for this treatment of the residues. The labor is the same as in the matte-fusion, but more wood is used, four cords being burned in twenty-four hours. Only two operations are made in twenty-four hours.

C. Treatment of the pimple metal.—The pimple metal is roasted again in the same way, treating it nearly five hours, and making four charges in twenty-four hours. Other bottoms are produced poorer in gold, but containing

Gold	60 to 100 ounces.
Silver	300 ounces.
Copper	75 per cent.
Sulphur	25 per cent.

The pimple metal from this fusion contains

Gold	$\frac{1}{2}$ ounce.
Silver	120 ounces.
Copper	80 per cent.
Sulphur	20 per cent.

the iron being entirely removed. This operation takes one and a half days. The bottoms are treated with the other bottoms. The pimple metal goes to the Ziervogel process B, but is kept entirely separate, because it contains no gold as does that of the process A.

VI.—TREATMENT OF THE RESIDUES OF THE ZIERVOGEL PROCESS B BY THE AUGUSTINE PROCESS.

The residues from the Ziervogel process B, which contain 25 ounces of silver per ton, are roasted with salt in one of the furnaces, B, Fig. 12, for roasting for sulphate of silver in the Ziervogel process. The residues are charged moist, a charge being one ton. It is heated for two hours, until it is hot. Twenty pounds of salt are then added, and well rubbed into the charge for fifteen minutes. The charge is then drawn,

to prevent the loss of copper, as well as chloride of copper. Three charges are made in twelve hours. This requires one man, and three-fourths of a cord of wood.

Solution.—This material is treated with a hot saturated solution of brine, a tank holding 1,000 gallons of the brine solution being always kept in reserve; 1,600 pounds of the chloridized residues are placed in a vat, and the solution allowed to constantly flow through it by an inch pipe for four hours.

The liquid which runs out of the solution-tubs runs into tanks, Figs. 30, 31, and 32, Plate III, where the silver is precipitated with copper in the tanks *i*, and the copper with iron in the tanks *k*, as in the Ziervogel process. The salt solution containing chloride of iron, is collected in the tank *o*, and is pumped back into the tanks and is used again. Chloride of iron by constant boiling becomes perchloride, and finally sesquioxide is precipitated. The salt solution lasts (with occasional renewals of water) indefinitely. The loss of salt, per ton of residue treated, is about 10 pounds. The residues from this treatment are either reduced and made into ingots, or sold as they are, as residues. The precipitation is the same as in the Ziervogel process, except that chlorides are formed. The material is always kept separate.

VII.—TREATMENT OF THE BOTTOMS.

Four tons of white metal, from the Ziervogel treatment, give 600 pounds of bottoms. These are left to accumulate until they amount to 3,500 pounds, enough for a charge in the small reverberatory furnace. The furnace in which this operation is effected is shown in the general plan, Figs. 1 and 12, at C, and in detail in Figs. 33 to 38, Plate III. The fire-place is 6 feet long, 4 feet deep, 42 inches wide at the bridge, and 20 inches at the grate. The bridge is 2 feet wide. The laboratory is 9 feet long, 6 feet 9 inches wide, and connects with the chimney, 2 feet 6 inches square, by a flue. The surface of the fire-place is 21 square feet, that of the laboratory 46.27 square; the relation, therefore, is 1 : 4. The furnace has a working door at the side and a charging door at the end. On the side opposite the working door there is a spout which ends in a wooden tank sunk in the ground, which is 4 feet 5 inches in diameter and 3 feet deep.

The object of the process is to oxidize the lead and other impurities, and to prepare the metal for treatment for gold. The charge is made at 7 a. m. It is first sweated at a low temperature for two or three hours, during which time some of the lead liquates and runs out of the furnace. It is then left to oxidize for three or four hours. In about seven hours the charge is well melted. The slag, which is skimmed at this time, is composed mostly of oxides of lead and copper, containing from 10 to 15 per cent. of copper, and is sent to operation No. 3. After the slag is withdrawn the bath is beaten with a rabble for about two hours, all the doors being opened to admit an excess of air. It is again skimmed and tapped into water. The "pitch," that is the condition of the copper, must be such that the whole of the sulphur is eliminated before the oxygen is absorbed. If the pitch is right the globules will all be round and hollow. This point must be seized with the greatest nicety, for if the charge remains too long in the furnace the globules will cast solid, and the charge must then be put back and worked with sulphur. The temperature of the water governs the size of the globules. They are small when it is cold and large when it is hot, but it does not otherwise affect it. It takes about ten minutes to do this casting. The copper flowing from the spout falls on to a pole of green

wood held underneath it, so as to scatter the copper. Care must be taken that the slag does not flow with the copper. To prevent it, the doors are opened, so that the slag is cooled until it is pasty. One charge is made at a time, and only one or two per month. The globules contain 1,000 ounces of gold, 600 ounces of silver, and a trace of lead. Twenty tons of white metal give one ton of refined auriferous copper. Three cords of wood are used, one man tends the furnace, one man does the firing.

VIII.—TREATMENT OF THE OXIDIZED COPPER ALLOY.

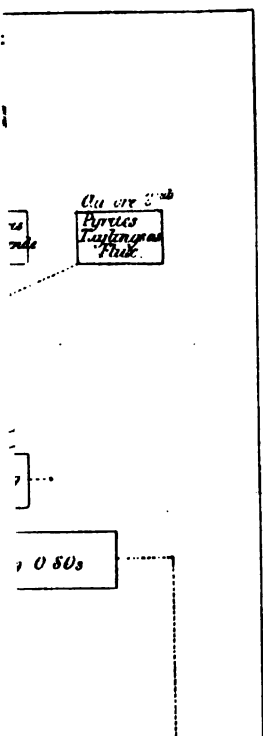
The copper globules are oxidized in one of the fine calciners, in which sulphate of silver is treated. One and a half tons are charged at a time. The oxidation takes thirty-six hours. The globules are put into the furnace in a heap and spread out over the hearth. The charge will be 3 inches deep. The fire-place is charged at once, and the temperature is made as hot as the red bricks will bear, and as oxidizing as possible. It is constantly rabbled. At the end of thirty-six hours a portion is taken out and tested, to see that it will pulverize completely. If it does, the operation is finished; if it does not, the oxidation is continued. The whole of the copper has been transformed by the operation into suboxide, and the charge is increased in weight about 500 pounds by the operation. The grains are black on the outside, but if broken or rubbed the streak is red. The charge is drawn out into an iron barrow and carried to the store-room. It is placed in bags, packed in petroleum-casks, and shipped to Boston. One cask holds 650 pounds. Three cords of wood are used for the process, and two men do the work, one man to each twelve hours' shift. The men are required to bring their own wood.

Solution of the oxidized-copper alloy.—The oxidized product is treated with dilute sulphuric acid. This is done in a conical tub lined with lead, having a false bottom. The bottom is hollowed so as to leave as little space as possible. A charge is 1,500 pounds. Over this, sulphuric acid at 20° Baumé is poured. Steam and air are turned on and the boiling continued for four hours. The whole is not dissolved, but 90 per cent. of the copper will be in solution. It is allowed to settle for an hour, and is siphoned off and a fresh charge put in. Two charges are made in a day. This is repeated until all the oxidized products have been treated. This work is not done at night. The residues are boiled two or three times in the same way to get out all the copper possible. The tub is then cleaned up and what remains is melted in plumbago crucibles. The bullion is from 600 to 800 fine of mixed metals. It contains from 40 to 50 per cent. gold and 20 to 30 per cent. of silver. This is sent to the mint.

The sulphate of copper is crystallized and sold. The mother liquid is used to dilute the acid used for the solution of the oxides.

The working of these alloys of gold, silver, and copper was first tried in the works, and was given up on account of the high price of sulphuric acid. It was carried on for more than a year in Boston, but has quite recently been abandoned, and the separation of gold and silver is now to be done at the works by a process invented by Professor Pearce.

In conclusion, I beg to present my warmest thanks to Professor Hill, who afforded me every facility for making the plans of the works and for taking the drawings of all the furnaces, and to Professor Pearce, who gave all the information which was required, both at the works and after my return to New York, concerning the various processes carried out there.



CHAPTER XIII.

THE HUNT AND DOUGLAS COPPER PROCESS.

For the following account of this process, I am indebted to Prof. T. Sterry Hunt and Mr. James Douglas, jr., the patentees.

This is what is technically called a wet method, because the copper is removed from its ores in a dissolved state, the solvent employed in the present process being a watery solution of neutral protochloride of iron and common salt. Most oxidized compounds of copper—whether obtained artificially by roasting sulphureted ores, or found in nature in the forms of carbonates and oxides—when digested with such a solution are converted into a mixture of protochloride and dichloride of copper, which are dissolved, while the iron of the solvent separates in the form of insoluble hydrous peroxide of iron. When the solution of the chlorides of copper thus obtained is brought in contact with metallic iron, the copper is separated in a metallic crystalline state, while the iron passes into solution, reproducing the protochloride of iron, thus restoring its solvent powers to the liquid which we shall call “the bath,” and fitting it for the treatment of a fresh portion of copper-ore. This process of solution and precipitation can, under proper conditions, be repeated indefinitely with the same bath, the only reagent consumed being the metallic iron.

The chief advantage which wet processes possess over smelting lies in the economy of fuel. To extract copper from a low-grade ore by smelting, five or six furnace-operations are necessary, and about one ton of coal is consumed for each ton of ore treated; while for the various wet processes a single calcination, in which not more than three hundred-weight of coal is consumed for each ton of ore, is the only furnace-operation required to obtain the metallic copper in a precipitated form known as *cement copper*. An important item of cost in wet processes is the metallic iron employed to separate the metallic copper from its solutions. The same amount of iron is required to precipitate a ton of copper whether extracted from a poor or a rich ore, but as for the smelting of the latter much less fuel is required, it follows that rich ores are generally treated by smelting rather than in the wet way, any saving of fuel in the latter being more than compensated for by the cost of iron. No general rule, however, can be laid down to determine what grade of ore can be more profitably treated by one method or the other, inasmuch as circumstances of locality, affecting the cost of fuel and the price of iron, must in each case be taken into account.

The various other wet methods of copper-extraction may be divided into two classes: those in which the previously oxidized ore is treated with hydrochloric or sulphuric acid to dissolve the oxide of copper, and those in which sulphureted ore, generally after a preliminary roasting, is calcined with an admixture of sea-salt or of sulphate of soda, by which the copper is converted into chloride or into sulphate. All of these methods, when properly applied, effect a pretty thorough extrac-

tion of the copper, but the cost of the reagents which have to be added to every charge of ore, preclude altogether the use of some of these methods, except in certain favored localities, and render them in almost all cases, it is believed, less economical than the present one with the Hunt and Douglas bath, for which the following advantages are claimed:

I. It is a general method adapted to all compounds of copper, while that by calcination with salt is only applicable to sulphureted ores.

II. It does not require the addition of reagents, such as acids, salt, or sulphate of soda, to each charge of ore, since in the regular course of the operation the solvent required for the treatment of the ore is constantly reproduced.

III. The bath employed being neutral, certain impurities of the ore, such as arsenic, which pass into solution and contaminate the product in the wet processes, remain undissolved, so that a purer copper is obtained.

IV. As the solution obtained is neutral and free from persalts of iron, there is no unnecessary waste or consumption of metallic iron in the process of precipitation. Moreover, as the result of the action of the protochloride of iron of the bath on protoxide of copper, one-third of the copper is obtained as protochloride, and two-thirds as dichloride. Now since the latter requires for each one hundred parts of copper precipitated only forty-five parts of iron, it is found in practice that not more than three-quarters of a ton of iron are consumed to precipitate one ton of metallic copper, while in the other methods, in which the copper is obtained as protochloride, the consumption of iron amounts to a ton, and in many cases greatly exceeds it.

WORKING DIRECTIONS.

Grinding the ore.—The degree of fineness to which the ore must be ground will depend entirely upon the character of the gangue. If the metal be scattered in fine particles through an impermeable rock, it will be necessary to grind it to the size of sand, so that the copper, if a sulphuret, may be exposed to the oxidizing action of the air during calcination, and to the solvent action of the protochloride of iron bath during lixiviation. If, on the contrary, the copper sulphuret be mixed, as is often the case, with iron pyrites, which by calcination becomes porous, the ore need not be ground so fine. Experiment in each case must determine the point, and upon the decision must depend the machinery which should be chosen to effect the grinding; Cornish rolls being preferable for coarse crushing and stamps for finer work. Two pairs of rolls—one pair of 24 or 30 inches diameter, and one pair of 12 or 15 inches, with a screen between them to sift out what is not broken sufficiently fine by the upper pair, will crush about twenty tons of stuff in twenty-four hours so that it will pass through a sieve of fifteen holes to the linear inch, a degree of fineness sufficient for most ores. A rock-breaker with jaws set close may be substituted for the upper pair of rolls.

Calcining the ore.—It is not necessary to calcine carbonates or protoxides, but mixtures in which there is a large proportion of red or dinoxide need a slight roasting to convert at least a part of this into protoxide; while all sulphureted ores require much more calcination. The mode of effecting this will vary with the character of the ore. When it contains 20 per cent. or upward of sulphur, it may be broken into lumps of an inch or more in diameter, and exposed to a preliminary roasting in heaps or kilns, whereby, without the aid of fuel, the greater

part of the sulphur will be driven off, and the metallic ingredients more or less completely oxidized. The lumps thus partially roasted should then be crushed and calcined in a muffle or reverberatory furnace. The calcination of all ores in an earthy gangue must be effected wholly in such furnaces.

The first rule in roasting is to expose the ore at the beginning to a low heat, which is to be gradually increased as the sulphur is driven off. If the temperature be too high at the commencement of the operation, the ore, if highly sulphureted, may become softened and agglutinated or fritted, after which it is impossible to effect a proper roast. But even if this should not happen, too high a heat at first, or indeed at any stage of the process, brings the copper into a condition in which it is difficultly soluble in the bath. A long furnace is more easily managed than a short one, since in the former the fire can always be kept strong and the ore moved forward from a cooler to a hotter portion, while in a short furnace the gradation of heat can only be attained by close attention to the firing.

A long muffle furnace always gives a good roast, as the tile floor protects the ore from excessive heat, and there is sure to be an oxidizing atmosphere in the furnace, which is not always the case in a reverberatory, where the flame comes in contact with the ore. But the construction of the muffle furnace is expensive, and a cheap and efficient furnace is a three-hearth reverberatory. When a number of such furnaces are needed, they may be built side by side, in a row, the rabbling-doors opening before and behind, and the arches of the whole row being supported by a stone buttress at each end—the only binding necessary. The fire-boxes of adjacent furnaces are placed side by side. The dimensions which have been found advantageous for these furnaces are as follows: Lower hearth 10 feet wide by 16 feet long; upper hearths 12 feet wide by 15 feet long. The lower hearth is contracted in width by the fire-place, and the upper hearths in length by the flues which lead from hearth to hearth.

The advantages of such a form of furnace are cheapness of construction and economy of heat, on account of the exposure of a less amount of cooling-surface than in the long reverberatory with rabbling-doors on the side. On the other hand the upper hearths are not very accessible to the rabblers. If such a furnace be used, the heat should only be sufficient to thoroughly dry and warm the ore on the uppermost hearth. Oxidation should take place, with the elimination of the greater part of the sulphur, on the second hearth, so that when the ore is exposed to the higher temperature of the lower hearth there may be no danger of fritting. The quantity of ore which may be roasted in such a furnace will depend on the character of the ore and the proportion of sulphate of copper which it may be desirable to obtain. If the ore is highly sulphureted and has not received a preliminary roast before grinding, only two or three tons can be calcined in twenty-four hours, whereas double that quantity may be treated if the ore be poor in sulphur. An ore with from 15 per cent. to 20 per cent. of sulphur may be added in charges of 2,500 pounds, and shifted from hearth to hearth every eight hours, while one containing from 5 per cent. to 7 per cent. of sulphur may be shifted every five hours.

If the ore contains no carbonate of lime or magnesia, (which will deprive the bath of the chloride of iron in the subsequent operation of solution,) the roast need not contain over one-fourth of its copper in the state of sulphate. This will be more than sufficient to repair unavoidable losses in the iron-chloride of the bath. The presence of portions of

these obnoxious elements may, however, make it desirable to obtain in the roast a larger proportion of sulphate of copper, (which is soluble in water and by its precipitation by metallic iron yields an iron-salt.) To obtain this the ore should be roasted more slowly and in larger charges, say of 5,000 pounds each, in which case the yield of ore from the furnace will be somewhat diminished.

The quantity of fuel consumed will vary with the different ores, but as a rule one cord of wood will suffice for three tons, and one ton of coal for eight tons of ore.

When a sulphureted ore has been properly roasted it loses, when being rabbled, that apparent fluidity which ore still giving off sulphurous acid exhibits, and when withdrawn and cooled should have a bright-red color. If the heat has been too great, the color of the cooled ore will vary through dull-red to black. There is more danger of having too much than too little heat in the furnace. The ore on the upper hearth should never be in a glow, and that on the lower hearth should never attain a higher heat than dull redness. Besides regulating the heat, it is important to attend to the admission of air. As the roasting of the ore is an oxidizing process an abundance of air is essential to the operation, and that this may be supplied, the furnace must possess a good draught and be provided with openings sufficiently large and numerous. If the furnace be defective in these points the ore will be scorched and its copper rendered insoluble by a reducing action on the lower hearth, while the upper hearth will be liable, at the same time, to become too hot.

The more completely the sulphuret of copper is oxidized in the roasting, the more thorough will be the subsequent extraction of the copper, but to oxidize the last traces of sulphuret requires a disproportionate expenditure of time, labor, and fuel. Upon the relative value of the raw ore, and of labor and fuel, will therefore depend the degree of thoroughness to which it may be profitable to carry the extraction of the copper at any given reduction-works. While it is desirable to oxidize as completely as consistent with economy the sulphurets of the ore, it should be borne in mind that a *dead roast*, as it is called, or the elimination of that portion of sulphur which, after oxidation, remains combined as sulphate of copper, is to be avoided, since, as already pointed out, to provide for unavoidable loss of chloride of iron, it is desirable to leave a portion of sulphate of copper in the roasted ore. The composition of the roast may be seen from the following examples:

At the Ore Knob Mine in North Carolina, the average of the ore roasted by this process was, according to Mr. Olcott, (Trans. Amer. Inst. Min. Engineers, vol. iii, p. 395:)

Copper as sulphate	3.76
Copper as oxide	7.75
Copper as sulphide	.39

11.90

At Phoenixville, Pa., where the ore contains a considerable quantity of carbonate of magnesia, the effect of which has to be neutralized by a large proportion of sulphate of copper, and where charges of 5,000 pounds of ore are calcined for twenty-four hours on each hearth of the dimensions above given, the roasted ore has the following average composition:

Copper as sulphate	1.25
Copper as oxide	1.10
Copper as sulphide	.40

2.75

Dissolving the copper.—The solvent or bath employed for the extraction of the copper is, as has been stated, a neutral solution of protochloride of iron with common salt. This protochloride may be obtained in various ways. In localities where acids are cheap it is easily made by dissolving scrap-iron in diluted muriatic or sulphuric acid; the first yields directly protochloride, the second protosulphate of iron, which when mixed with a solution of salt gives rise to the protochloride, together with a portion of sulphate of soda. In places where acids are not so easily had, the commercial protosulphate of iron (green copperas) is the most convenient source of the protochloride, as explained in the specification. One hundred pounds of the commercial acid and 56 pounds of scrap-iron will make 280 pounds of copperas. Knowing the relative cost of these substances at any locality, it will be easy to calculate whether it is cheaper to make the copperas or to purchase it. Where highly sulphureted copper-ores or copper-pyrites are to be had, these, by calcining at a low red heat, (as already stated,) yield large proportions of sulphate of copper and sulphate of iron, both of which are soluble. By leaching these roasted ores with water, and digesting the solution thus obtained with scrap-iron, the dissolved copper is thrown down as metal, and a solution of protosulphate of iron obtained, which may be mixed with salt to form the bath.

In the original specification of the process it was directed in making the bath by the use of protosulphate of iron to take 280 pounds of this (equal to 56 pounds of metallic iron) and 120 pounds of salt, sufficient to convert it into protochloride. These dissolved in 1,000 pounds of water (100 imperial gallons) with a further addition of 200 pounds of salt made the strongest bath, but a weaker one was also recommended in which these same ingredients were to be dissolved in 2,000 pounds of water. Experience has shown that the latter is strong enough for the treatment of all ordinary ores.

The bath may be brought in contact with the ore either by percolation in leaching-tanks, or by agitation in vats arranged with stirrers. If the ore be finely ground and slimy, the latter must be used; but if it is coarse, and contains nothing which when wetted will form mud, it is best treated by leaching. When agitation is required the tank should be round, 10 or 12 feet in diameter, and 5 or 6 feet high, and made of 3-inch staves. A convenient stirring-apparatus consists of two oblique blades fixed to the base of a vertical shaft, which rests on the vertex of a conical bottom. The tips of the blades should reach to within an inch of the sides of the tank, and be raised about 15 inches above the level of the bottom of the tank at the periphery. The object of thus elevating the stirrer on a cone above the bottom is to permit the ore to settle below the blades, so that the stirrer, after having been stopped, can be started at will; whereas, were the bottom flat and the distance between it and the blades the same at all points, the ore would accumulate around the shaft and thus escape agitation. The stirrer should make about twenty revolutions a minute. A vat of the above dimensions, having a capacity of about 3,000 gallons, and two-thirds filled with bath, will serve to agitate and dissolve the copper from 3,000 pounds of roasted ore, containing five or six per cent. of copper oxide, in six to eight hours, the temperature being from 120° to 150° F. The stirrers are then stopped, the whole allowed to settle, the clear liquor drawn off into the precipitating-tanks, and the muddy portions into settling-tanks, after which the residue may be washed, first with bath, and then with water, to remove the adherent copper solution.

When percolation can be adopted it is preferable to stirring, since,

though the operation is slower, we are enabled to dispense with the settling-tanks, which the latter plan requires, and the handling of the slimes which accumulate in these. Moreover, as the solution of the copper takes place in the mass of ore out of contact of air, a larger proportion of dichloride of copper is found and less iron is lost by oxidation than when the solution holding the dissolved iron and copper salts is exposed to the air by constant agitation.

The vats for filtration are made of wood or of brick. For the latter the bricks are laid in Roman cement and coated within by a layer of the same cement mixed with silicate of soda. This, when afterward washed with a solution of chloride of calcium, forms a coating which resists the action of the metallic salts of the bath. If wood be used the vats may either be square or round, but in any case they should be somewhat wider at the top than at the bottom, otherwise the settling and contraction of the moistened ore will leave a space along the walls through which the bath may descend without percolating the mass. Filtering-vats need not be more than three feet high. The filter may be made by laying on the bottom of the vat three inches of small stones, broken cinder or coke, and covering this by a layer of coarse sand, upon which the ore may be laid to the depth of one or two feet according to its coarseness or fineness. Instead of this arrangement a false bottom, consisting of perforated planks or of narrow boards loosely laid together, may be covered over with coarse sacking, upon which the ore is spread. A hole in the side near the bottom of the tank, into which is fitted an india-rubber tube provided with a squeezer or pinch-cock, gives vent to the liquor after its passage through the ore. The vats should be fitted with close covers so as to exclude the air and retain the heat; these are provided with a small hole through which enters a tube to supply the bath. It is well to spread the ore in the vats already partially filled with heated bath, as when thus wet down it will not cake, but will permit the bath to percolate uniformly through it. When the desired quantity of ore has been added a wooden float should be secured beneath the opening in the cover so that the bath, as it flows in, may fall thereon, otherwise it would make a depression in the mass and thus the percolation would be unequal. About two or three inches of bath should be kept on the top of the ore, and it should be supplied as rapidly as it escapes from the tube below. When the outflowing liquid is found, by testing with a bit of iron wire, to contain no more copper than the liquid entering above, we know that the soluble copper has been removed and it only remains to stop the supply of bath, allow the layer above to filter through, and then displace that which remains in the pores of the exhausted mass by the addition of a little water. The extraction of the copper by filtration may not be completed in less than three or four days, the time of course depending on the richness of the ore and the strength and the temperature of the bath.

The solution of the copper is much accelerated by heating the bath, which may be done by the injection of steam. If the liquid be heated to from 120° to 180° F. it will flow through the ore in the leaching-tanks with a very little reduction of temperature, and the heat generated in the process of precipitation will, if the tanks for this operation are well covered, maintain the bath in these at a sufficient temperature to insure a quick separation of the copper, so that it is only the liquid in the store-tanks that will require heating by steam.

The bath after it is withdrawn from the precipitating-tanks generally contains a little copper. If, however, care be taken to leave it there till the whole of the copper is separated, the liquid will then be without

action on metallic iron, and steam coils may be used to heat it in the store-tank, or in passing from this to the leach-vats it may be made to pass through a coil of iron pipe heated by a stove.

Where kilns are used for roasting, the heating of the liquors, as well as the evaporation of the excess of liquid derived from the wash-waters, may be effected in Gay-Lussac towers, which are small brick or stone chambers, tall and narrow, filled with fragments of coke or broken bricks, in which an ascending current of the hot air and sulphurous vapors meets a descending current of the liquid. The hot gases from the kiln or from a muffle may also be utilized by drawing them through a pipe from 4 to 6 inches in diameter by means of a small steam-jet introduced at the bend in an injection-pipe, which at that point should be contracted to 2 inches, and may dip 2 feet or more into the liquid in the store-tank. Such an arrangement saves steam and serves to impregnate the bath with sulphurous acid, which in its passage through the ore in the filtering-vats serves to attack the separated peroxide of iron, converting it into soluble protosalt.

The use of the sulphurous acid fumes, which thus serve to supply the losses of protochloride of iron, need not be resorted to except in treating native carbonates or oxides of copper, or such ores as contain carbonates of lime or magnesia or oxide of lead or of zinc, all of which cause a loss of the protochloride of iron. In such cases the best mode of applying the sulphurous acid is by using stirring-tanks and passing the gas over the surface of the liquid, which is agitated during the solution of the copper. The gas should be as little diluted with air as possible. If the roasting-kiln or muffle-furnace be connected with the stirring-tank by an earthenware tube which enters either the cover or the side of the tank at a point opposite to that by which a wooden tube (best connected with a flue) gives exit to the unconsumed gas, a sufficiently rapid current of the gas will be kept up, and will be readily absorbed by the liquid in the tank.

It is seldom, however, that the process is thus complicated by the necessity of using sulphurous acid gas, for unless the objectionable matters mentioned above are present in considerable quantities in the ore, this, if a sulphuret of copper, will yield by careful calcination, as already explained, enough sulphate of copper to compensate for the loss of chloride of iron which these would occasion.

By the introduction of steam for heating and of water for washing the residue, the volume of the bath becomes slowly augmented. To reduce this it is therefore necessary to resort to evaporation, and for this purpose it has been found that in the case of the three-heated reverberatory furnaces already described, the upper hearth may with advantage be used for this purpose. A shallow basin 6 inches deep, of which the upper hearth is the bottom, is built of brick lined with Roman cement prepared as already described for brick-leaching tanks, with silicate of soda and chloride of calcium. Through the middle of it passes a funnel or hopper connecting with the second hearth and opening on the roof of the furnace for the purpose of charging the ore. The roof over the pan should be higher than if it were over a calcining-hearth, in order to give ample room to use a scraper with which to remove the crystals of salt which separate during evaporation, and two doors instead of three should open at each end so as to give free access to the whole surface of the pan. Care should be taken to keep the floor of the pan free from all accumulations of salt, else a crust will be formed which is difficult to remove. When this arrangement is used, the liquors from the store-tank are run into the pan where they are exposed to the escaping cur-

rent of hot air and gases by which they are rapidly evaporated, while at the same time they absorb a considerable amount of sulphuric acid, (which, together with sulphurous acid, is formed in the slow roasting of pyritous ores,) and thus become strongly acid. An evaporator of this kind, with a surface of 100 square feet, is easily and cheaply constructed, is tight and durable, and will evaporate a layer of 4 inches of liquid in 24 hours, by the waste-heat. If the three hearths are required for calcination, large shallow tanks of the kind described may be constructed between the furnaces and the stack, so that the whole current of the hot gases shall pass over the surface of the liquid, thus dispensing with the use of steam for heating the liquors and evaporating the bath at the same time.

Precipitating the copper.—The copper liquors, whether taken from the stirring or settling tanks or flowing from the leaching-vats, are received in tanks of any convenient size, where, in contact with metallic iron, the chlorides of copper are decomposed, and the copper is precipitated in crystalline grains, plates, or crusts, the texture of which will vary according to the strength of liquors. Wrought-iron precipitates the copper more rapidly than cast-iron, but where this latter is the cheaper, it should be used. If small scrap is employed, it must be spread on trays arranged in the vats. If the residue, after the extraction of the copper, is a nearly pure oxide of iron, this may be reduced to a spongy metallic iron by heating it for some hours at a red heat with pulverized coal in a closed vessel. This spongy iron, which may also be easily made from ordinary iron-ores, precipitates copper very rapidly from its solutions, and is used for that purpose in England, where it is prepared in a reverberatory furnace.

From the precipitating-vats the liquor, which has been deprived of its copper, and in this process has been recharged with protochloride of iron, is drawn off after twenty-four hours or more and pumped up into the store-tank, which should be at a higher level than the leaching-vats. It is then ready for the treatment of fresh portions of ore. A working drawing of a cheap pump, made entirely of wood, is included in the plan annexed.

Melting and refining the copper.—The precipitating-tanks are emptied from time to time, the cement-copper is washed with water and, if small iron scrap has been used, is passed through a screen or sieve to separate any fragments of the latter. It is then dried at a gentle heat, when it is ready for refining. In the treatment of copper obtained in wet process it is customary to melt the cement with a portion of matte or sulphureted ore, and thus obtain a crude copper, which is refined by a second fusion. Experience on a large scale has, however, shown that the purity of the cement obtained by the present process is such that but a single fusion is required to convert it into fine copper. The dried or even the moist cement is melted down in a furnace such as is used for refining blister-copper, poled in the usual manner, and then cast into ingots. It is found advantageous to mix the cement with one or two hundredths of coal-dust, and if compressed into blocks, it can be handled with greater advantage than if in a loose powder.

Arrangement of plant.—It is well, when it can be done, to choose a hill-side as the site for works for carrying out this process, so as to place the leaching-vats below the level of the calcining-furnaces. Above these vats should be a water-tank and also a store-tank for bath, from which it can be made to flow into the vats placed in rows on the lower level. Below these should be placed the precipitating tanks, and still lower a large tank into which the bath when deprived of copper can be

allowed to flow, and from which, by means of the wooden pump, it is to be pumped up into the store-tank for redistribution, thus establishing a continuous circulation. Wooden tubes securely coupled together are the best conductors for the bath. A horizontal line of such tubing should run above the leaching-vats and be connected with the store-tank by a piece of India-rubber tube or hose, which can be closed at will by a wooden squeezer. From this line of wooden tubing the bath is to be conducted to each leach-tank by an India-rubber tube, the flow through which is to be regulated by squeezers. From the leach-tanks the copper liquors should be conducted through similar India-rubber tubes into a covered trough or launder, running the whole length of the row of precipitating-vats. Such a trough is better for this purpose than a closed tube, for the reason that when the bath is too cool or does not hold a sufficient amount of salt to retain the whole of the dichloride of copper in solution, a portion of this may be deposited and fill up the tube, while the launder can be watched and this state of things guarded against.

In localities where a hill-side cannot be chosen for the site, it will be better to place both the leaching and precipitating vats on the same level with the calciners, for it is easier and cheaper to pump the copper liquors into the precipitating-tanks than to elevate the ore. In the plan, however, for clearness of illustration, the tanks are shown on successive levels in a building of three stories.

CHEMISTRY OF THE PROCESS.

The peculiarity of this method is the use of a solution of *protochloride of iron* and chloride of sodium to render soluble the oxidized compounds of copper. In the wet process now generally adopted in Great Britain and mentioned on page 25, where the ores are calcined with common salt, this is in great part decomposed with the formation of sulphate of soda and chlorides of copper, which are, in their turn, decomposed when in solution, by contact with iron, with separation of metallic copper and production of *protochloride of iron*.*

The liquid thus obtained, holding an abundance of *protochloride of iron* with a little chloride of sodium, is found to have but a feeble solvent action upon the oxide of copper and is accordingly thrown away, polluting the rivers, and thus giving rise to serious difficulties in England. Various attempts have been made to utilize the chloride of iron in these waste liquors for chloridizing copper. Gossage patented a plan which consisted in evaporating them to dryness and heating the residue in contact with air to low redness, by which means there is obtained a mixture of insoluble peroxide and soluble *perchloride of iron*, (see page 24.) Henderson effects the same result by the action of air on the liquors at ordinary temperatures. He also, by decomposing the evaporated waste liquors at a strong red heat in contact with siliceous matters, gets perchloride of iron in vapor with some hydrochloric acid and free chlorine, and dissolves these in a solution of *protochloride of iron*,

* The concentrated liquid obtained by leaching the ores in this process, at Widnes, in England, gave, according to Claudet, for a liter of specific gravity 1.24, sulphate of soda, 14.41 grams; chloride of sodium, 6.39; chlorides of copper and other metals 12.75, containing chlorine 6.61, copper 5.28, zinc 0.68, lead 0.057, iron 0.045, silver 0.004, besides a little gold, and small but undetermined quantities of arsenic, antimony, and bismuth. Of the copper, 0.590 was in the state of dichloride. The silver extracted from this solution by Claudet's method, with iodine, contains about 1.3 per cent. of gold. (*Chemical News*, vol. xxii, p. 184.)

thus getting a solution of *perchloride of iron*, the solvent action of which on oxide of copper is well known. (British patent of May, 1865, No. 1255, and United States patent, December, 1866, No. 60514.)

To dispense with these tedious and costly processes and enable liquor containing *protochloride of iron* to be directly used for the solution of copper, was much to be desired. It was found that when a solution of protochloride of iron is brought in contact with either protoxide or dinoxide of copper, dichloride of copper is formed, which, being insoluble in water, soon coats over the oxide and arrests the chloridizing process. To overcome this difficulty, however, it was only necessary to add a hot and strong solution of common salt, in which (as in all other solutions of chlorides) the dichloride of copper has a considerable degree of solubility. The reactions of the two oxides of copper with protochloride of iron are unlike. Three equivalents of the protoxide, containing 95.25 of copper, when brought in contact with an excess of solution of the protochloride under the conditions just explained, react with two equivalents of it, containing 56.00 of iron, and yield one equivalent of the protochloride of copper, which is readily soluble in water, and contains 31.75 of copper and 35.50 of chlorine, and one equivalent of the insoluble dichloride, in which the same amount of chlorine is united with twice as much, or 63.50, of copper. When the copper is in the state of dinoxide, only one-half as much protochloride of iron is consumed, and there is formed for the same amount of dichloride as before one equivalent, or 31.75 of metallic copper. This would remain undissolved if the dinoxide alone were treated, but metallic copper in presence of an excess of protochloride of copper is at once converted into the dichloride, so that if one-half of the oxidized copper in a mixture treated with an excess of protochloride of iron is protoxide and one-half dinoxide, the whole of the copper passes into the state of dichloride.* For this reason it is necessary, in submitting dinoxide ores to this process, either to mix them with a sufficient amount of ores containing protoxide, or to calcine them slightly in the air, so as to convert one-half or more of the dinoxide into protoxide of copper.

In the reaction between the oxide of copper and protochloride of iron, the iron of the latter separates from the solution as a reddish-brown insoluble precipitate of hydrous peroxide, which carries with it a small portion of chlorine in the form of an oxychloride of iron, due to secondary reactions and in part to the action of the air upon the solution of protochloride of iron. The amount of chlorine thus removed, and consequently lost to the bath, was found, in carefully-conducted experiments, to vary from 5 to 10 per cent. of that originally united with the iron, that is to say, for 100 parts of protochloride of iron consumed in chloridizing copper, the regenerated bath will contain from 90 to 95 parts. This loss of chlorine must in all cases be supplied if the strength of the bath is to be kept up, an end which is readily obtained in one or two ways. When sulphureted ores are oxidized there is always formed a portion of sulphate of copper, which, with careful roasting, (page 10,) may equal one-fourth or even one-half of the copper present. This sulphate when decomposed by metallic iron gives protosulphate of

* The reactions between protochloride of iron and the oxides of copper are thus expressed in chemical symbols, using the older notation, in which Cu = 31.75, Fe = 28, Cl = 35.5, and O = 8:

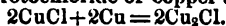
For the protoxide of copper,



For the dinoxide of copper,



In the reaction between the protochloride of copper and the metallic copper,



iron, which, by its reaction with salt, yields, as we have seen in the preparation of the bath, sulphate of soda and protochloride of iron, which in ordinary cases more than suffices to supply any loss of chlorine. If, as sometimes happens, there is found too large a portion of these compounds, this may be corrected by adding to the bath, *previously freed from copper*, a small quantity of slaked lime, by which means the excess of sulphate and of iron are precipitated in the form of sulphate of lime and protoxide of iron, from which the clear liquid may be drawn or filtered off.

The bath made, as already described, with 280 pounds of copperas (equal to 56 pounds of iron) and 320 pounds of salt in 2,000 pounds of water, has a specific gravity of about 22° Beaumé or 1.150 at ordinary temperatures, water being 1.000. A cubic foot of it weighs 1,150 ounces avoirdupois, and contains 3.52 pounds of protochloride of iron (besides an equal quantity of sulphate of soda) and about 5½ pounds of salt. This amount of protochloride contains 1.54 pounds, or 10,780 grains of metallic iron, and as a cubic foot is equal to almost exactly 1,000 fluid-ounces, each fluid-ounce holds in solution 10.78 grains of iron as protochloride. By the method of assay described above, the amount of iron held in solution by a fluid-ounce of the liquid is very easily determined, and in this way the efficiency of a bath is most conveniently designated. Solutions containing 5.0 grains, and even 3.0 grains, of dissolved iron to the fluid-ounce may be used, but the strongest are most efficient.

The protochloride of iron serves to chloridize the oxide of copper in the ore. A cubic foot of bath containing 10,780 grains of dissolved iron will chloridize 18,287 grains (or 2.61 pounds) of copper in the state of protoxide, converting one-third of it into protochloride, and two-thirds of it into dichloride of copper, of which latter compound (consisting of copper 63.5, chlorine 35.5) there will be formed 29,057 grains, or about 4.15 pounds. The dichloride is insoluble in water, though readily soluble in strong brine, especially if this be heated; hence the necessity of a large excess of salt in the bath. A cubic foot of saturated brine at a temperature of 194° F. will dissolve about 10.0 pounds, and at 104° F. about 5.0 pounds of the dichloride, while a cubic foot of brine holding 15 per cent. of salt will dissolve at 194° F. 6.25 pounds, at 184° F. 3.75 pounds, and at 57° F. 2.18 pounds of dichloride of copper, and the same amount of brine holding only 5 per cent. of salt will dissolve at 198° 1.65 pounds, and at 104° 0.70 pounds of dichloride. The bath above described, with 5½ pounds of salt to the cubic foot, contains not quite 8 per cent. of salt. It will thus be understood why in some cases it may become necessary to increase the amount of salt in the bath in order to augment its solvent power for the dichloride. Both by cooling and by dilution with water the dichloride separates in the form of a white heavy crystalline powder, which is readily converted by simple contact with metallic iron into pure crystalline copper.

In treating copper ores which contain no sulphur and consequently form no soluble sulphate in roasting, the loss of the bath in chlorine may be supplied by adding, from time to time, small portions of protosulphate of iron, or still better by passing over or through the liquid in the stirring or leaching vats, as already described, (page 16,) a current of sulphurous acid gas. This, being absorbed, converts the separated hydrous peroxide of iron into a mixture of protosulphate and protosulphite of iron, at the same time liberating the combined chlorine of the oxychloride in the form of soluble protochloride.

As the protoxide of copper is a comparatively feeble base, the solutions of the protochloride are readily decomposed by the oxides of zinc

and lead, which are often present in roasted ores. These cause the separation from the solutions of a green insoluble oxychloride composed of oxide and protochloride of copper, chloride of zinc or of lead being formed at the same time. In the presence of an excess of protochloride of iron this oxychloride of copper is immediately dissolved, as oxide of copper would be, but in the reaction a certain amount of chlorine is consumed in forming the chlorides of zinc and lead. An excess of oxide of copper also unites with protochloride of copper to form this oxychloride, so that in leaching ores charged with oxide, the protochloride of copper formed is at first retained in a form insoluble in water and in brine, but as it is completely dissolved in an excess of protochloride of iron, this reaction gives rise to no difficulty in working.

In like manner carbonate of lime, though without action on solutions of protochloride of iron below 212° F., readily decomposes protochloride of copper at 140° F., with separation of a similar oxychloride, which requires protochloride of iron to redissolve it. In this way the presence of carbonate of lime in copper-ore *indirectly* causes a loss of protochloride of iron, which must be supplied in one of the ways already set forth. The action of carbonate of magnesia is similar to that of the carbonate of lime. Neither these substances nor the oxides of lead or zinc separate the copper from the dichloride.

In the precipitation of the copper by metallic iron 28 parts of this metal unite with 35.5 parts of chlorine, and in so doing separate from a solution of the protochloride 31.75 of copper, and from the dichloride twice that amount. Hence to obtain 100 parts of copper from the first requires 88.2 parts, and from the second 44.1 parts of iron, while from solutions in which one-half the copper exists as protochloride and one-half as dichloride the amount of iron required will be the mean of these two, or about 66 parts for 100 of copper.

In the roasting of sulphureted copper-ores the greater part of the copper (apart from the sulphate) is obtained as protoxide, besides a variable amount of dinoxide, sometimes, according to Plattner, as much as 20 or 30 per cent. of the copper.* Such a mixture when treated in the bath gives rise, of course, to a correspondingly large amount of dichloride, which is, however, generally nearly counterbalanced by the protochloride resulting from the reaction between the sulphate of copper and the salt of the bath, so that the proportion of iron required to separate 100 parts of copper from the solution of such roasted ores varies from 60 to 70 parts. Hence the present process presents, in this respect, a great economy over the ordinary wet methods in which the precipitation of 100 parts of copper requires 100 and often 120 or more parts of metallic iron.

A solution of protochloride of copper when mixed with salt not only has the power of chloridizing and dissolving metallic copper, as already described, but readily takes up the copper from sulphureted ores, such as the vitreous and variegated species, and from copper matte or regulus, with separation of sulphur and formation of dichloride. This reaction may, in some cases, be taken advantage of by causing a hot solution, nearly saturated with salt and holding protochloride of copper, to filter through a layer of such ore or regulus in coarse powder. The metal is

*In some cases we have found in such roasted ores a portion of sulphate of dinoxide of copper. This remains when the ordinary sulphate (of protoxide) has been removed by water, and may be dissolved from the residue by a hot solution of common salt, by which this insoluble sulphate is converted into dichloride. Some copper-ores of 15 or 20 per cent. have yielded as much as 1 per cent. of copper in this form, which is of course readily soluble in the protochloride of iron bath.

rapidly taken up, and solutions obtained in which the whole of the copper is present as dichloride. In this way an additional amount of copper is dissolved and may be separated in the metallic state with very little cost. The 66 parts of iron required to precipitate 100 of copper from the ordinary solutions of mixed protochloride and dichloride will separate from solutions of pure dichloride 150 parts of copper.

WHAT ORES OF COPPER MAY BE TREATED BY THIS PROCESS.

The forms in which copper occurs in nature may be conveniently grouped in three classes, to each of which, under certain conditions, the Hunt and Douglas process may be advantageously applied.

In the first class may be included the various sulphureted ores, such as copper pyrites (often mixed with iron pyrites) and the variegated and vitreous sulphurets, all of which are readily oxidized by calcination. In addition to these are the fahl-ores, which contain, besides sulphur, arsenic and antimony. These objectionable elements by calcination are either expelled or rendered insoluble. All the above-named ores yield their copper after oxidation to the Hunt and Douglas bath. The question of the comparative fitness of this method for rich and poor ores has already been discussed on page 396.

In the second class are included the oxidized compounds of copper, such as the red and black oxides, the green and blue carbonates, salts like the oxychloride, and also silicates of copper like chrysocolla. All of these are readily attacked by the bath without previous calcination; but in the case of the red or dinoxide, as already explained above, it should either be mixed with protoxide ores or in part converted into protoxide by a slight calcination, in order to render the copper wholly soluble. The carbonates of copper, which are readily dissolved in the bath, give off their carbonic acid so as to cause frothing, to prevent which it may be well to give them a slight calcination or roasting. Heating them to low redness in a kiln or furnace for a few minutes will be sufficient to convert the carbonates into protoxide.

The common silicate of copper called chrysocolla readily gives up its copper to the bath of protochloride of iron and salt, so that its treatment, whether alone or mixed with other ores, presents no difficulty. A peculiar ore which is now treated successfully by this process at Phoenixville, Pa., is a hydrated silicate of oxide of copper with magnesia, alumina, and peroxide of iron, containing when pure about 13 per cent. of copper. This mineral, which may be described as a copper-chlorite, is readily and completely decomposed by acids, but is not attacked by the bath of protochloride of iron. To extract the copper it is treated as follows: The crude ore, which is mixed with clay and sand and carries from 3 to 6 per cent. of copper, is heated to low redness for some hours in large vertical muffles, each holding 15,000 pounds, having been previously mixed with one-tenth its weight of coal in coarse powder, by which the combined oxide of copper is reduced to the metallic state. This, on withdrawing the heated charge, is at once oxidized by the air, yielding a mixture of protoxide and dinoxide of copper, which are readily and completely removed by the subsequent operation of leaching with the Hunt and Douglas bath. The copper is chiefly dissolved in the form of dichloride, as is shown by the fact that not more than 50 parts of metallic iron are required to precipitate 100 parts of copper from the solution.

The third class includes the deposits of native or metallic copper, which in almost all instances are most advantageously treated by me-

chanical means. In those rare cases in which the copper is too finely divided to be thus profitably extracted, it will be found that by careful calcination at a low red heat it may be oxidized so as to become soluble in the protochloride-of-iron bath. In this, as in all other cases of non-sulphureted ores, it is, as already explained, (page 401,) indispensable to supply the loss of chlorine by the use of sulphurous-acid fumes, or by the addition from time to time of a protosalt of iron.

The presence of carbonate of lime or carbonate of magnesia in any ore is objectionable, since, as already explained, (page 406,) it decomposes the protochloride of copper, and thus indirectly precipitates the iron from the bath. The action of oxides of lead and zinc, which come from the roasting of blende and galena when these are present in the ore, produces a similar effect. When not present in too large quantities the effect of all these substances may be corrected by careful roasting, which forms a large proportion of sulphates, or by the use of sulphurous fumes, but ores containing much carbonate of lime or carbonate of magnesia are not adapted to treatment by this or any other wet process.

PRACTICAL WORKING OF THE PROCESS.

The Hunt and Douglas process, after some experimental trials, was first worked continuously for a year, in 1872-73, at the Davidson Mine in North Carolina, under the direction of the Messrs. Clayton. The ore, a pyritous copper in a slaty gangue, was dressed up to 5 or 6 per cent., crushed to pass through a sieve of forty meshes to the linear inch, roasted in three-hearth reverberatory furnaces so as to contain about one-fourth its copper as sulphate, and treated in stirring-vats in charges of 3,000 pounds. The loss of copper in the residue was found to be from 0.3 to 0.5 per cent., and the bath maintained its strength in chloride of iron without the use of copperas or sulphurous acid. The amount of iron consumed was equal to 70 per cent., and the salt, to supply unavoidable losses, to 25 per cent. of the copper produced. These details are from a letter from the manager of the works, Mr. James E. Clayton, published in the *Engineering and Mining Journal* for July, 1873, from which it appears that the entire cost of producing cement-copper from the dressed ore of $5\frac{1}{2}$ per cent. was estimated to be $3\frac{3}{4}$ cents a pound.

This mine was subsequently abandoned, and the same proprietors, in 1874, erected works with six calcining-furnaces for the treatment of 12 tons of pyritous ore daily by this process at the Ore Knob Mine in Ashe County, North Carolina. Up to the 1st of January, 1875, over 200 tons of copper had there been made by this process. In the report bearing that date of the directors of the Ore Knob Company, James E. Tyson, of Baltimore, president, it is said: "From the data furnished by the superintendent in his report from the mine, and a careful estimate made here, we find the cost of making copper, mining, and all expenses included, to be less than 8 cents a pound."

These works were soon after enlarged to nearly three times their former capacity; but in sinking below the water-line in the mine the ore, hitherto free from lime, was found to contain 30 per cent. or more of carbonate of lime, with some magnesia. The direct treatment of such an ore by any moist process was impracticable, and the reduction-works were accordingly suspended pending the erection of dressing-works, in which it is proposed to concentrate the ore by crushing and washing, removing thereby the carbonate of lime of the gangue. The concentrating machinery, as we are informed by the managing director of the Ore Knob Copper Company, Mr. James E. Clayton, will be in operation

in June, 1876, when it is proposed to recommence at once the treatment of the purified ores by the Hunt and Douglas process.

Reduction-works are now in successful operation at Phoenixville, Pa., where copper-ores of two kinds are treated by the Hunt and Douglas process, the first of which is a magnetic-iron ore from Berks County, Pennsylvania, containing about 3 per cent. of copper, chiefly as copper pyrites, mixed, however, with a little carbonate and silicate of copper. This ore, of which 20,000 pounds are treated daily, is crushed so as to pass through a sieve of seven meshes to the linear inch, roasted as already explained on page 398, and subsequently treated by leaching. The residue, which contains about 0.5 per cent. of copper, is a rich iron-ore, which is used for lining puddling-furnaces. The second ore is the peculiar hydrated silicate described on page 407, of which 15,000 pounds are treated daily. The leached residues of this do not retain over 0.3 per cent. of copper.

The works of the Stewart Reduction Company, at Georgetown, Colo., in which this process is applied to mixtures of silver and copper ores, will be again referred to.

TREATMENT OF SILVER AND GOLD ORES.

The use of soluble compounds of copper as an agent in treating silver-ores and rendering them fit for amalgamation, has long been known, and is the basis of the Mexican patio process and its modifications, as well as of the Washoe process, now largely employed in the West. The theory of the action of the copper salts in the first of these methods, where the materials are exposed for a long time to the action of the air, is still somewhat obscure. In the Washoe method sulphate of copper and common salt are added together to the ground ore mixed with water, and from these, by the reactions which take place in the pans, dichloride of copper is soon formed. This substance dissolved in brine is used directly with advantage in the treatment of silver-ores by Janin and by Kröncke. From the results of various experiments, it is clear that solutions, both of protochloride and dichloride of copper, mixed with common salt, when at an elevated temperature, effect a complete chlorination of sulphureted and arsenical silver-ores, or at least render them susceptible of ready and complete amalgamation.

The use of the chlorides of copper as hitherto applied presents, however, several difficulties: first, the sulphate of copper from which they are generally prepared is costly, and in some places difficult to procure; second, protochloride of copper is readily decomposed and separated from hot solutions as an insoluble oxychloride by the carbonate of lime often found with the ores; third, solutions of dichloride of copper in brine very readily absorb oxygen from the air, forming, besides, protochloride of copper, also an insoluble oxychloride. These oxychlorides are without action on silver-ores, though they attack the mercury when amalgamation is attempted simultaneously with the treatment by copper salts, forming an insoluble chloride of this metal, and thereby causing a considerable loss.

To meet these objections there is needed a cheap and ready method of preparing the chlorides of copper, and a simple means of preventing their precipitation in inert or noxious forms by the action of the air or carbonate of lime. It will be apparent from the preceding account of the chemistry of the Hunt and Douglas copper process, that the use of a heated solution of protochloride of iron and salt, aided by sulphurous acid, for the solution of the oxidized compounds of copper, meets the conditions of the problem in the following manner:

1. The Hunt and Douglas bath gives readily and cheaply strong solutions of the mixed protochloride and dichloride of copper wherever carbonates, oxides, or calcined sulphureted ore of this metal can be had.

2. It dissolves the oxychlorides of copper, by whatever means produced, changing them into a mixture of protochloride and dichloride of copper, and thus prevents any deterioration of the copper solution by the action of the air or of carbonate of lime.

The Hunt and Douglas bath may be advantageously applied : *

I. To effect more cheaply and more completely the chlorination and the amalgamation of such silver-ores as are now treated in the raw state with chemicals, as they are called—that is to say, sulphate or chloride of copper with common salt.

II. To chlorinate such silver-ores as have been calcined without the addition of salt.

III. To complete the chlorination of silver-ores which have been partially chlorinated by calcining with salt, thus securing a much more complete extraction of the silver than has hitherto been attained.

In all of these cases it will be understood that some oxidized form of copper, such as carbonate, native oxide or calcined sulphureted ore, is to be added, unless it is already present in the silver-ore to be treated. It may be added even in large quantities with advantage, and from the solutions charged with copper a portion, or the whole of this metal, may be precipitated from time to time by metallic iron as cement copper.

In localities where salts of iron are not readily obtained, and where sulphur-ores are abundant, it will be found that by passing sulphurous-acid gas into or over a solution of salt holding pulverized oxide or carbonate of copper in suspension, a solution of dichloride of copper will be readily formed, and this reaction may be rendered available for this treatment of silver-ores. By precipitating the copper solution thus obtained with metallic iron, protochloride of iron is at once readily and cheaply obtained.

Silver-ores chlorinated by the Hunt and Douglas bath may be subsequently treated, either by dissolving the silver from the washed residues by a solution of hyposulphite or of chloride of sodium, or by amalgamation. The use of mercury is to be preferred for ores holding, besides silver, a portion of gold. Such ores should be treated with the bath in the raw state, or after simple calcination, roasting with salt being for them objectionable.

United States letters-patent (No. 151,763) for the use of the Hunt and Douglas bath of protochloride of iron and common salt, conjointly with sulphurous acid, for the treatment of silver-ores, or silver and gold ores, mixed with oxidized ores of copper, were granted June 9, 1874, to James Douglas, jr., Thomas Sterry Hunt, and James Oscar Stewart. This process has now been most successfully applied for more than a year on a large scale in the working of silver-ores by Mr. Stewart, who will publish in the course of the summer of 1876 a detailed description of the method as adapted by him to various kinds of silver-ores. Copies of this (and also of the present pamphlet) may be had by addressing J. Oscar Stewart, Georgetown, Colo.

* Later observations show that this process may be advantageously applied to the treatment of the tellurides of silver and gold.

CHAPTER XIV.

EXPERIENCE WITH THE STETEFELDT FURNACE.

By A. D. HODGES, JR.

These notes refer to the years 1871 and 1872, and to the Auburn Mill, situated at Reno, Nev. During that time the mill treated ores of the most varied nature and from very different localities. If an ore was considered very "rebellious" it was sent to the Auburn Mill for treatment, while more easily-worked material was kept at home. Large supplies were drawn from Utah, but the rise in the railroad freight tariff in the winter of 1871-'72 interfered materially with the shipments of the lower grades of ores, the increase in the freight charge being sufficient to counterbalance the small profit previously derived from such ores. From Humboldt County, Nevada, and from various places along the line of the Central Pacific Railroad, considerable amounts were derived. Very rich ore, running from \$400 to \$900 per ton, was received from Mono County, California. This was the partzite or stetefeldtite ore of which so much has been said. The most distant locality from which shipments were made was British Columbia, whence one lot of 20 tons was received.

The Utah ore held often considerable chloride of silver with oxidized silver, lead, minerals, and generally lime. This class of ore was the most difficult to treat. Ores (as much from Humboldt County) with quartz gangue and considerable sulphurets (of lead and zinc) worked well. The stetefeldtite ore, although causing some trouble with the men on account of the dust, which was claimed to be worse than from the usual run of rock, always roasted very well.

The general plan of working was this: The ore was broken in a Blake crusher, and carefully sampled for assay. It was then dried on the dry kiln on which was spread first the required amount of salt—from 6 to 10 per cent.; crushed under the stamps; carried in mechanical conveyers to the furnace and roasted; and, finally, amalgamated in Wheeler pans.

The plant of the mill was as follows: 1 Blake crusher; 20 stamps of 750 pounds each; 1 Stetefeldt furnace, with dry kiln, &c.; 12 small Wheeler pans; 6 settlers; 2 agitators; boiler; retort; overshot water-wheel of 28 feet diameter and 16 feet face, calculated to furnish 108 horse-power.

The ditch from the Truckee River is some two miles long, built to be 4 feet deep, 8 feet wide at the top and 6 feet wide at the bottom, with a fall of $\frac{3}{8}$ inch to the rod, and calculated to carry 4,000 inches of water per minute.

Sampling.—For sampling, the ore was crushed to a uniform size in the Blake crusher, and spread out evenly on the floor to a depth of 8 to 10 inches. Cuts of the width of a shovel were run through the pile in two directions and about 4 feet apart; from the ore obtained from these cuts another similar pile being made, and this being continued until a pile of about 100 pounds is obtained. The ore is now again crushed, spread out and reduced as before, until the amount is brought down to 20 or 30 pounds.

This is then taken to the assay-office, crushed fine, and resampled down to about one pound. Some of the customers preferred sampling from the battery, which was done when requested. But a battery sample never gave higher results than the other, and often somewhat lower ones. In case there are malleable minerals of the precious metals present, it is easy to see why the battery sample should be the poorer.

Crushing—The battery stamps weighed 750 pounds when new, had a fall of 8 inches, and dropped about 80 times per minute. The screens were No. 55 wire. The batteries were single discharge.

General experience teaches, I take it, that the most rapid crushing by stamps is effected when only sufficient ore is kept in the mortar to prevent the shoe and die from coming in contact. But one battery-feeder at this mill persisted in keeping the mortars so full that the foreman was in constant expectation of the choking of the batteries. Yet from this cause the stamps were hung up only once, and this feeder crushed $1\frac{1}{2}$ tons to the stamp where no other feeder had been able to put through more than a ton.

The furnace.—The Stetefeldt furnace is 28 feet high and $4\frac{1}{2}$ feet square at the base. It is of the old pattern, with two fire-places for wood at the base and one at the flue, using the old form of feeder—two simple wire screens. It was built in 1869, and although cracked a little by earthquake action, has stood the wear and tear extremely well, having needed no repairs of any consequence.

The amount of ore roasted daily was in practice 16 tons. Unquestionably the furnace will treat more, but during the time alluded to this was all which the batteries would crush, one battery of four stamps being hung up for repairs nearly all the time.

On each shift of twelve hours three workmen were employed, one tending the feeding apparatus, one firing, and one drawing out the roasted pulp, and wheeling it to the pans. Whites were employed for a long time, at \$3 per day, but afterward Chinamen.

The amount of salt used averaged in practice 8 per cent., but this was undoubtedly in excess of what was needed in many cases, and may possibly have been injurious in the subsequent amalgamation. When the furnace was kept running night and day an average of $1\frac{1}{2}$ cords per twenty-four hours was consumed, slab-wood answering all purposes. A charge was drawn every hour. The roasting expenses, when running on full time, may be given as follows, taking as data the actual work done at the Auburn Mill. Chinese labor is referred to:

2 firemen, at \$2.....	\$4 00
4 feeders and dischargers, at \$1.75.....	7 00
8 per cent. salt=2,560 pounds, at $1\frac{1}{4}$ cents.....	38 40
$1\frac{1}{2}$ cords of wood, at \$5.....	7 50
Total expenses for 24 hours.....	56 50
or \$3.56 per ton.	

Roasting results.—With careful management this furnace gave excellent results. The chief requisites were: regular firing, sufficient heat, and controlling assays. In practice, it was found that the Chinese firemen maintained a more regular temperature than did the whites. So far as my experience went, the best results were obtained when the heat was as great as possible without causing the ore to cake. But the temperature must remain constant. Under these conditions the largest proportions of the base metals are volatilized. Any intelligent foreman, who is willing to be guided by assays and not from immature guesses can easily learn to manage the furnace.

With our workmen it is not possible to employ as high a heat in reverberatory furnaces—principally on account of the caking of the ore—as can be safely used in the Stetefeldt furnace. The advantages of high heat are that the base metals are more speedily and completely volatilized and oxidized, thus securing a finer bullion, the silver is more fully chloridized, and I have reason to believe an economy in salt can be secured. From the working at the Auburn Mill I was convinced that an unnecessary amount of this material was used. In reverberatories, for mechanical reasons, an excess of salt is requisite. But in the Stetefeldt furnace, not only is a good mixture of the salt and the ore easily obtained at the outset and maintained thereafter, but the whole of the chloridizing reagents as vapor come in most intimate contact with the fine ore-dust descending the shaft. My opinion as to the possible economy in salt has been confirmed by the results since obtained at the Surprise Mill at Panamint. Here, with base ores assaying \$75 to \$90 per ton, $2\frac{1}{2}$ per cent. of salt was found sufficient to give a chlorination of 92 per cent., and in practice only $2\frac{3}{4}$ to 3 per cent. was used.

With a high heat in treating lead-ores, the bullion at the Auburn Mill was seldom under 600 fine. In reworking the tailings, (without roasting,) the bullion was often only 75 to 80 fine, but afterward Mr. Riotte, I am given to understand, by first roasting these tailings, raised the fineness to over 500. At Panamint the bullion produced from "rather base" ores was from 960 to 980 fine. In experimenting with these ores and roasting them at a low temperature, bullion only 300 to 500 fine was obtained.

The lots of ore worked at the Auburn Mill being of very varied character, the furnace was thoroughly tested as to its chloridizing capabilities. It in practice chloridized the silver to from 85 to $96\frac{1}{2}$ per cent. The most difficult ores to treat were the oxidized ores containing lime. These needed an addition of sulphur in some form, but without this 85 per cent. was always obtained when proper care was exercised, the percentage rising from this to 88 or 89.

The best form in which to supply sulphur when required is that of pyrites. Mr. Stetefeldt has assured me that in common practice 1 to $1\frac{1}{2}$ percent. is sufficient. When pyrites cannot be obtained, Kustel's method of burning sulphur outside of the furnace and conducting the fumes into the shaft would appear to be a good one.

Ores containing oxide and peroxide of manganese seem to give good chloridizing results even without sulphur. Cupriferous ores have generally given very good results. A considerable portion of the copper is volatilized. Mr. O. Hoffman found that with an ore assaying 12 per cent. in copper 22 per cent. of this metal volatilized into the condensing chambers, 10 per cent. remained as chloride and subchloride, and the balance turned into oxide. I have found at times much larger percentages volatilized.

Ores containing lead are generally considered the most difficult to roast, yet we obtained very good results. The main trouble was the caking of the mass at the bottom of the furnace. With a constant and strong heat from 10 to 50 per cent. is volatilized. Ore containing 8 to 10 per cent. of lead (as sulphide) gave me the highest results of any treated. A lot of 40 tons of this kind chloridized to an average of $94\frac{1}{2}$ per cent., commencing at $90\frac{1}{2}$, then rising to 95, and reaching $96\frac{1}{2}$. This average is the one obtained from all the numerous tests made of the samples taken for the guidance of the foreman. It may be relied on, and is, I think, as good an average as can be shown anywhere. Mr. Hoffman found that the addition of a little charcoal prevented any cak-

ing of ores rich in lead, the charcoal exercising only a mechanical action.

Ores containing 10 per cent. of zincblende, and even more, have been worked without trouble. Of the 40 tons just spoken of, about three-quarters, if I remember aright, contained 9 to 10 per cent. of zincblende, and had been sent to us because the shipper had failed to get any satisfactory results previously. (These figures are from memory. My notes and assays here are lost.) Another lot holding a large percentage of zincblende chloridized to over 90 per cent.

The fine dust in the flues was always well chloridized. The ores shipped to the mill generally held no gold, but a few tests with rock holding a little of this metal showed as much gold in the flue-dust as in the shaft-pulp. The percentage extracted I do not now remember. I have been told by Mr. Stetefeldt that in comparative tests made at Twin River from ore roasted in his furnace about 85 per cent. of the gold was obtained, while from the same ore roasted in a common reverberatory furnace only about one-quarter of this amount was extracted.

Amalgamation.—The amalgamation of the ores did not correspond with the results obtained in the furnace. In some instances very good returns were obtained, and I think that a lot of 100 tons, worked for the Mineral Hill Company, yielded considerably more than 85 per cent. of the assay-value. But the general yield was not over 80 per cent.

This result was due evidently to the imperfect working of the pans. The pulp was hardly ever of the proper consistency, being too thick in the commencement and too thin at the end. The charges were worked for six hours generally, in small Wheeler pans holding about 800 pounds. There was often a deficiency of quicksilver, and the pans were usually in poor condition. One reason for this state of affairs was the existence of a board of trustees in London, which tried to manage the mill from that distance, and considered it economy to spend nothing in the way of repairs or quicksilver.

The tailings often showed 10 to 15 per cent., and more, of the silver in them as a chloride. Whenever there was a lack of ore and a sufficiency of quicksilver, they were worked over, but as no account of the amounts was kept, I can give no percentages. Mr. Riotte has since worked these tailings, roasting them before amalgamating, and can probably give interesting results. I understand that he extracted about 80 per cent. of the assay-value, and obtained a bullion 500 to 700 fine.

The amalgamation results have been better in other mills, as at Austin and Panamint, so far as I can learn. At Panamint, the extraction by amalgamation was generally 2 per cent. below the chlorination. At Austin, the results have been less regular, for some reasons unknown to me, sometimes even exceeding the chlorination, sometimes falling 5 per cent., and in one case, July, 1874, nearly 9 per cent. lower.

It would seem very probable that humid extraction might profitably replace amalgamation in connection with this furnace. With this view I made a few tests of several tons at the Auburn Mill, and obtained favorable results as regards yield and fineness of bullion produced. Similar results have attended like experiments at Austin. But I believe that amalgamation is still retained universally north of the Mexican boundary.

One point more I mention with considerable hesitation. Out of three tests, two showed the presence of silver in the water coming from the pans. I have no knowledge of silver having been found thus in solution at other mills. I mention the fact here merely to call attention to the matter. At the time a *large amount of salt*—10 per cent. I think—was

being used with the ore. I commenced a series of experiments subsequently in order to test the subject, but the mill was closed down, and in the excitement attendant on the occasion the sheriff managed to get hold of the vessels holding the test-liquor, and, by upsetting them, upset the experiment very effectually.

Expenses.—What the cost of working ore at the Auburn Mill actually was I am unable to state. The receipt of custom ore was very irregular, the mill was out of repair, so that only a part of the machinery could be run steadily, and the tailings were worked and reworked without any account of the amounts being kept. Still I will venture on an estimate of what could be done at this mill, based on the following general data, and applicable to conditions then actually existing:

The mill works rich custom ore at an average of 16 tons per day. It is situated about two miles from the railroad. The ore is received in small lots, keeping the assayer busy. The superintendent is obliged to travel considerable of the time in quest of ore, thus requiring a book-keeper.

General expenses include salary and traveling expenses of the superintendent, salaries and expenses of a book-keeper, a foreman, a hostler, a horse and wagon, and the office.

Assaying: An assayer, assistant, and assay-office.

Hauling: 2 teamsters, 2 wagons, and 6 horses.

Sampling and crushing: 4 samplers and dryers, 2 battery-feeders, castings, oil, &c.

Roasting: As before given.

Amalgamating: 2 amalgamators, 2 retorters and boiler-men, 1 blacksmith, fuel, castings, quicksilver, oil and lights, general repairs.

The cost of working per ton may be estimated as follows:

General	\$2 40	Roasting	\$3 56
Assaying	1 23	Amalgamating	4 37
Hauling	92		
Sampling and crushing	1 52	Total	14 00

Modifications of the furnace.—The furnace at Reno has always been very successful, although the first built. In furnaces constructed after this, some modifications have been made which it may be of interest to name in this connection.

The next furnaces after the one at Reno were those at Austin, Mineral Hill, White Pine, Belmont, Pioche, Pinto, and Troy. These were furnished with gas-generators, (in place of the simple wood fire-places,) and it was at first intended that charcoal alone should be used in these as fuel. But at Austin it was found more economical to use wood, cut in small pieces, together with the charcoal, in the proportion of one or two of wood to one of charcoal. It was found also that the use of wood in this manner gave with some ores better chloridizing results, an effect attributed to the generation of steam in the fire-gases, and thus a better formation of HCl . But although the generators always produced a steady heat and a good clear flame when properly managed, yet the difficulty of handling them with unskilled labor and the inability of the management in many cases led to a general return to the simpler wood-grate. At Austin, no trouble was experienced, and the gas-generators were retained, so far as I can learn.

Then, the grate for wood fires was placed lower than before, and an air slit introduced above the arch of the fire-place, so as to effect a complete burning of the flame, and introduce an excess of oxygen for desulphurizing purposes. Thus, I am told, with proper care, as regular a fire is obtained as from the gas-generators.

Still later, the height of the shaft was increased 10 feet where the ores worked were very base. The latest plan I know of shows a distance of 26½ feet from the fire-bridge to the top of the shaft. An automatic feeder, now generally used, dispenses with the labor of one man per shift.

In order to cheapen the construction, one fire-place only is built for small furnaces—those with a capacity of about 16 tons. The furnace at Belmont was constructed in this manner, and, I am told, gives good results as to the chloridizing action, but with the effect of driving the descending ore rather too much to the opposite side of the shaft, so that it descends somewhat unevenly. A similar furnace near Homansville, Tintic District, Utah, is said to do very good work. Still I am inclined to believe that the economy in construction and fuel will, in the long run, be counterbalanced by a more imperfect furnace-action.

The size of the auxiliary fire-place has been increased so as to obtain a higher heat here and a more perfect chlorination of the finest dust. A sample of this very fine dust, taken from the bottom of the draught-chimney at the Surprise Mill, Panamint, was chloridized to 96 per cent.

The last modification of which I have heard is an automatic discharge, by means of which the ore is kept hot a longer time at the bottom of the shaft, and none is withdrawn which has but recently dropped down the furnace.

In conclusion, I add a few examples of the working of the furnace, which I hope may be of some interest.

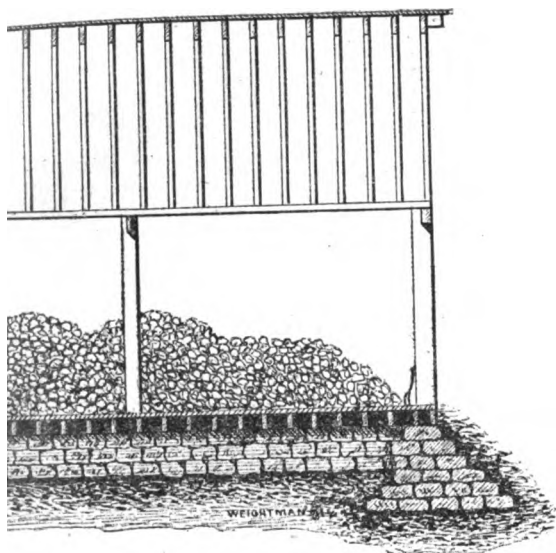
Mill.	Location.	Date.	Tons treated daily.	Total tons worked.	Chlorination per- centages.			Authorities.
					Highest.	Lowest.	Average.	
Manhattan	Austin...	January to August, 1874	27½	4,351½	91.7	89.0	90.4	} A. Trippel. C. Weberling. A. D. Hodges, Jr.
Surprise ...	Panamint.	January to Sept'r, 1875 ...	23	5,000	92.8	89.8	91.3	
Auburn ...	Reno	1875 to 1876	16	40	96.2	89.0	92.0	
		October, 1872			96.5	90.5	94.5	

* Monthly averages.

PART III.

MECHANICAL.

27 M



CHAPTER XV.

KROM'S CRUSHING AND CONCENTRATING APPARATUS.

Repeated allusions have been made in this series of reports to the concentrator invented by Mr. Stephen R. Krom, of New York, in which the medium employed is air. Impressed by the ingenuity, perseverance, and earnestness with which Mr. Krom has for many years pursued this branch of ore-dressing, and deeming his machine the best of its kind now before the public, while I did not fully admit the theoretical argument by which he sought to prove the inherent superiority of air to water as a medium of ore-dressing, I invited him to furnish an account of his whole system for this report. It was my purpose to accompany it with a critical analysis from the theoretical standpoint; but this I have had no opportunity to prepare; and I therefore publish Mr. Krom's statements and claims without comment, though some of them call in question propositions laid down in my former reports, chiefly on the authority of Rittenger. The subject will be discussed by Mr. Althaus in the reports on the Centennial Exposition, where Krom's machinery was exhibited and received an award.

With regard to the system of crushing introduced by Mr. Krom, I know but little in the way of practical experience. Of course his concentrator demands dry crushing, if the cost of drying the wet-crushed ore is to be avoided—to say nothing of the difficulty of so drying the pulp that it will behave properly in the air-concentrator. The superiority in dry-crushing of rolls over stamps has often been claimed; but the results of practice have seemed to leave the matter in doubt—principally on account of the unequal wear of the rolls. If Mr. Krom's graving and facing of his rolls obviate the difficulties heretofore experienced with that form of crusher, no doubt he can use them to advantage. But the merits of his concentrator, which are great, do not depend upon the other machinery which he sells in connection with it.

CRUSHING.

An ore to be concentrated must be granular instead of pulverized, and any system of crushing which diminishes the percentage of dust or "slimes" to the minimum amount, is the proper one to adopt.

The subject will be understood by a study of the following figures:

Ores from rollers, crushed to pass 100-mesh screen to the square inch, give:

Granular grains.....	88 to 90 per cent.
Flour and dust (which will pass screen of 10,000 meshes to square inch).....	12 to 10 per cent.

And ores from rollers crushed to pass a screen with $\frac{1}{2}$ -inch holes give:

Granular grains.....	92 per cent.
Dust passing screen of 10,000 meshes to square inch.....	8 per cent.

And according to Kustel (following Rittenger) wet crushing under stamps, through $\frac{1}{2}$ -inch holes, gives:

Sand	32 per cent.
Flour.....	32 per cent.
Dust	36 per cent.
	} 68 per cent.

Again,

"The average loss at large of poor argentiferous ores in concentration by water is with

Coarse sands	40 per cent.
Middle fine	35 per cent.
Slimes	60 to 70 per cent."

From the above it will be seen that rollers produce in crushing through $\frac{1}{4}$ -inch holes 8 per cent. of flour and dust, and that stamps produce in similar coarse crushing 68 per cent. of flour and dust, and that the loss in dust and flour is very much greater than in the coarse grades, amounting in *wet concentration* from 60 to 70 per cent.; or, to substitute data furnished by the dry concentration works at Star Cañon, Nevada, the tailings, from low grade De Soto ore, gave the following:

Coarse tailings, per ton	\$3 23
Middle fine tailings, per ton	3 67
Fine tailings, per ton	8 00

It will therefore be observed that the finest grades of crushed ore are the most difficult to concentrate and in which the greatest loss occurs, and that, moreover, the very finest portion of the crushed product cannot be concentrated by any mechanical means whatever, as it is well known that some portions will float in the air, and a *much greater* portion will remain suspended in water. For example:

"Battery sands, crushed through a No. 6 slot screen, contain on an average of slimes which remain suspended after three minutes' rest in still water, 19 per cent."—(*Commissioner Raymond's Report of 1873*, page 332.)

It will not be necessary to further elaborate the subject, as it is well known that concentration depends on the difference of specific gravity, and that when ore is crushed so fine as practically to have lost its specific gravity, concentration is impracticable.

From the above statement it will be manifest that a granular condition of the ore is absolutely essential to concentrate with any degree of success, and our aim must be to employ the kind of machinery which will produce the least amount of floating dust.

It seems hardly necessary to explain the fact why rolls produce so small a percentage of dust in comparison with that from the stamp-mill, since the reason is obvious; the jaw-crusher, and also the rolls, when properly applied, simply break up the ore, and all particles which are fine enough fall immediately away, receiving no further crushing; whereas, in the use of the stamp-mill, the blows continue to fall on some portions after they are already too fine, simply because the manner in which the crushed particles escape from further blows is mostly accidental rather than positive. The stamps may fall repeatedly on the same particles after they are already fine enough, because the splashing which the fall of the stamp produces may not carry such at once through the screen.

Aside from the fact that stamps are totally unfit for the purpose of preparing ore for concentration, it is doubtful whether their use is advisable under any circumstances; but my purpose would be accomplished in showing in what manner ores should be crushed for concentration, and the proper machinery for the purpose. I shall, however, go a step further and institute a comparison in the matter of cost between the two systems of crushing, viz, wear and tear and power consumed, in order that the question of economy shall also be demonstrated and understood.

In regard to the wear, breakages, and power consumed in crushing with stamps, and other features incident to their use, I take some data from United States Commissioner Raymond's report of 1873, page 330, and report of 1874, page 179.

"A shoe lasts from 21 to 43 days—on an average 33 days—crushing 79 tons of rock. Wear, $1\frac{1}{4}$ pounds of iron per ton of rock. The die lasts on an average 7 weeks, crushing 100 tons; wear, $\frac{1}{10}$ pound of iron per ton of rock. The stem breaks generally square across the fiber near the upper face of the head, and wears, without breaking, about 60 weeks, crushing 864 tons. When the irons are new and of fine quality, the breakages are rarer, occurring, perhaps, but once in 120 weeks. The rewelding, including the necessary new iron, costs on an average \$10. The stems, as well as the cams, last at least ten years. The battery-linings last six months. The tappets from two to three years.

It is seen, therefore, that shoe and die crush on an average 89 $\frac{1}{2}$ tons of ore, and the wear of the iron from shoe and die average $1\frac{1}{4}$ pounds per ton of ore crushed; but only about $\frac{1}{10}$ of the actual weight of shoe and die is worn in use. So, taking into account the portion cast aside with the portion worn, the consumption of iron amounts to 3 pounds per ton of ore crushed.

Again, the data furnished by Professor Trippel, found in Commissioner Raymond's Report of 1874, page 197, supply reliable statistics of the wear of stamps when crushing hard quartz:

Krom's Laboratory Crusher.

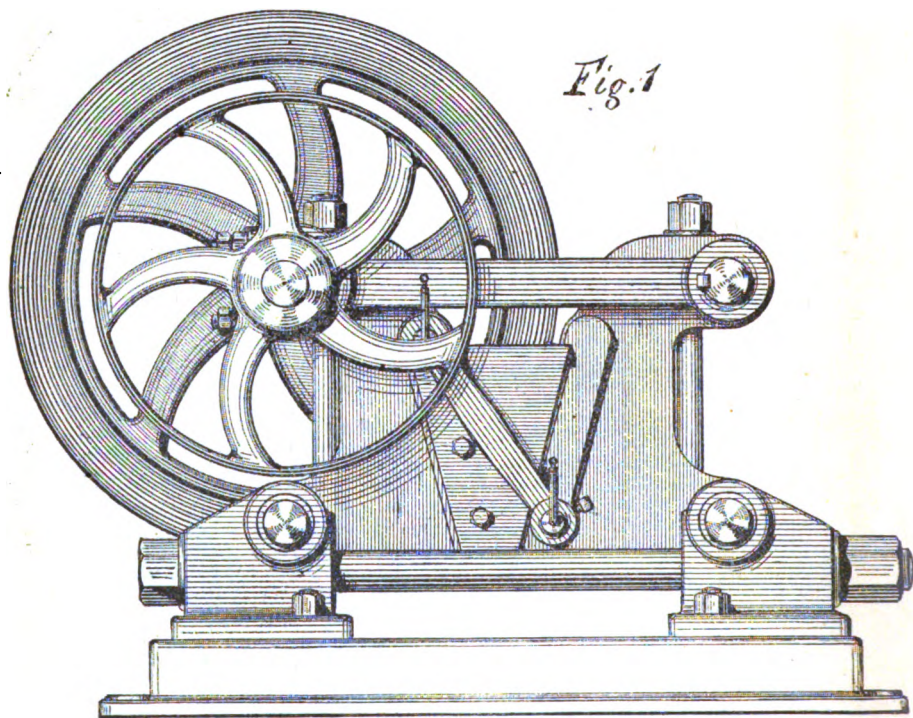
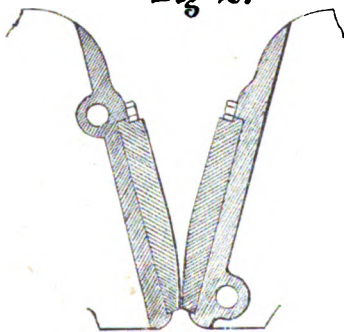
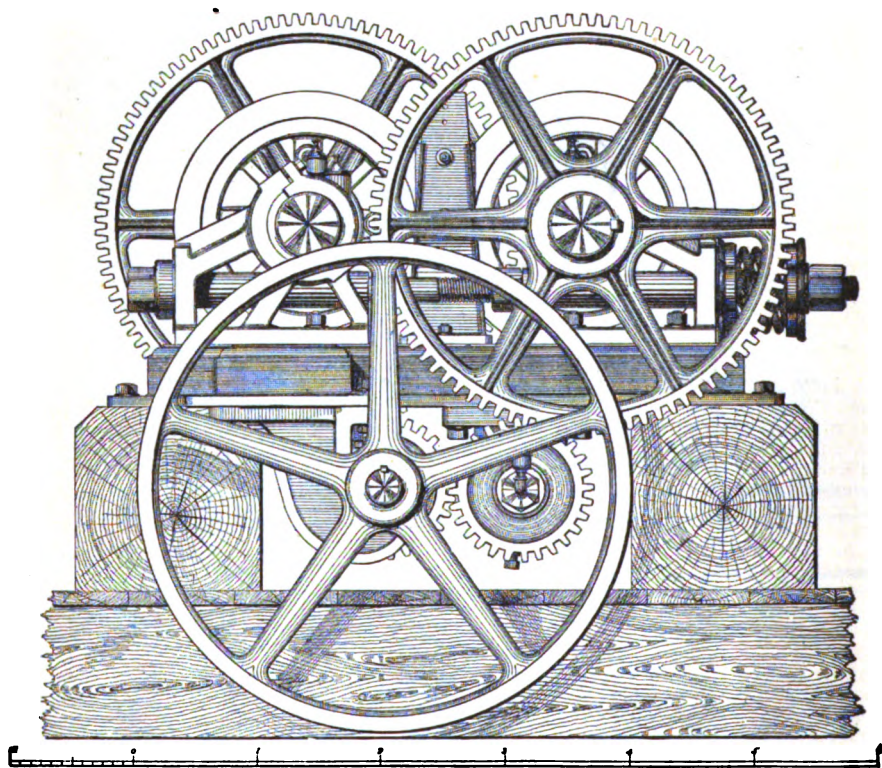


Fig 2.





KROM'S STEEL CRUSHING-ROLLS

Manhattan Mill milling expenses per ton of raw ore.

1873.	Labor.	Fuel.	Supplies.	Quicksilver.	Salt.	Official labor.	Castings.	Hauling.	Average total.
January.....	\$10 04	\$10 32	\$1 71	\$3 33	\$3 28	\$1 02	\$1 94	\$1 36	\$33 00
February.....	11 34	10 94	2 20	3 35	3 28	2 00	2 36	1 74	37 21
March.....	11 88	9 50	2 27	3 05	2 69	1 65	2 60	2 12	35 76
April.....	8 45	10 84	2 28	2 44	2 56	1 16	2 46	1 88	32 07
May.....	8 16	9 14	1 96	2 25	3 37	97	2 05	1 17	28 09
June.....	8 17	8 75	1 89	2 32	2 21	1 00	1 99	93	27 31
July.....	8 40	9 13	2 05	2 65	2 64	1 22	1 67	1 33	29 09
August.....	8 84	10 03	2 08	2 75	2 52	92	1 56	1 10	29 80
September.....	8 92	11 11	2 23	2 74	2 98	88	1 64	94	31 44
October.....	9 52	11 47	1 90	2 67	2 73	93	1 65	98	31 85
						average cost.	1 99		

Professor Trippel estimates the proportion of the cost due to crushing alone to be 85 cents per ton. And others estimate the cost with stamps, in wear, at 50 cents per ton, the wear and cost, of course, varying with the hardness of the ore.

Krom's laboratory crusher.—The accompanying view represents a crusher for laboratory use.

In this machine (unlike any other) both jaws oscillate on centers, fixed some distance from the crushing faces.

The principal feature is the employment of segments of circles, between which the ore is crushed on the same principle as rollers act.

It will be seen (Fig. 2) that the lower ends of the crushing-plates are true segments of circles, and throughout all the movement of the jaws they remain at fixed distances from each other, but the top part of the plates recede from each other with straight lines. The crusher can be adjusted, by means of the bolts, so as to produce either fine or coarse crushing.

It is the only machine in the market adapted for laboratory use.

Rolls.—Before describing the crushing-rolls, shown in the accompanying drawing, I will add, as before intimated, some more facts regarding the efficiency of rolls for crushing ores, and the qualities desirable in them. I speak of the rolls as more applicable for completing the crushing of the ore as it comes in small pieces from the jaw-breaker. For such purpose no other style or kind of machine can be equal to them, when properly constructed; since, first of all, my rolls not only bring into contact, within a given space of time, the largest amount of crushing surface, but also present this in the best manner to the material.

The efficiency of any machine for the crushing of ore depends, in general—first, on the condition in which it leaves the crushed product; secondly, on the durability of the crushing surfaces; and thirdly, on the rapidity with which it will perform the work. Rolls, by acting not to pulverize, but simply to break up finely, the previously divided material, leave the latter in the best possible condition for concentration, while they present surfaces as little liable to wear rapidly or unevenly, as any other form of crushing faces; and, the movement being continuous and rapid in one direction—so that there is no *loss motion*—the result is to secure crushing of the largest amount of ore, in a given time, and with the greatest economy.

In a similar manner to that in which the jaw-crusher operates so effectually on large pieces of ore, do the rolls act on small fragments; namely, as fast as the material becomes reduced fine enough to pass between the jaws, or in the small space left between the faces of the rolls, it immediately falls away, and receives no further comminution. Not so, however, with the stamp-mill, which continues to crush long after a large portion of the particles are already too fine; because, in it, the fine material escapes from the action of the stamps rather by accident than by any positive and certain means.

I will also call attention to the superior qualities in rolls not found in the jaw-crushers. It will be understood that in the latter all the ore must pass through the narrow opening at the bottom of the jaw; and the principal wear is at this point. It will be near enough correct to say that the last inch performs the final crushing before leaving the machine, and that the principal wear of the jaw is as indicated by the irregular lines. Assuming, then, that the last inch of the jaw controls the quantity deliv-

ered, we have, in a crusher 7×10 at the delivery point, 10 square inches, and this multiplied by the number of bites per minute, viz, 250, makes 2,500 square inches per minute of surface at the limit of delivery. Calculating the same for rolls we have in the circumference of 26-inch rolls $81\frac{1}{2}$ inches; this by 15 inches, the width of the face, equals 1,228 square inches in the surface of the roll, and this by the number of revolutions per minute (50) amounts to 61,425 square inches of crushing surface per minute in 26-inch rolls, as against only 2,500 in a jaw crusher of 7×10 , running 250 revolutions per minute. Then, again, but a small proportion of the jaw or jaw-plates can be utilized, as shown by the irregular line of wear, viz, less than $\frac{1}{2}$ of the weight of the metal, whereas such rolls as herein described, over 80 per cent. of the steel tires is utilized. It will therefore be quite apparent that in all cases where the ore is not larger than say $1\frac{1}{2}$ inch in size, rolls should be used in preference to any other machine; and, for very extensive operations, the employment of rolls capable of taking pieces larger than $1\frac{1}{2}$ inch would be more economical than jaws.

Great economy, not to speak of other advantages, will be found in employing rolls of considerable size; since not only do such present the best form of surfaces for acting on the ore, but with them, also, the renewal of the surfaces will be less frequently required, on account of the large amount of material in them to wear upon, and thus truing will be less frequently required.

The improved patented rolls, the employment of which I recommend, and which are herewith illustrated, may be described briefly, as follows:

1. First in importance is the improvement in the crushing-faces themselves. These consist of steel tires or rings, manufactured expressly for the purpose. It is confidently believed that these steel crushing-faces will continue to give the greatest satisfaction, because the material made use of is more tough and even in its texture than any heretofore employed for the purpose, and the wear of the faces, consequently, more even; and when, in the course of time, these do become worn uneven, the steel is not, as is the case with chilled surfaces, so hard as to prevent its being turned true again. The steel tires described are fitted to inner rings, or hubs, as clearly shown in the drawing, and with the aid of the tool (see Fig. 3 and 4) for keeping the rolls true they may be worn to $\frac{1}{2}$ inch in thickness before being cast off.

Chilled or hard rolls, when (as they will become in a short time) uneven by use, must be thrown aside, and that although but a small part of the thickness has been worn in actual service; and since the rings must in any case be about 3 inches thick, to have to cast them aside because already too uneven for further profitable use, when only about $\frac{1}{2}$ inch of the surface has been worn away, is evidently to subject the operator to frequent and very considerable expense and delay. And so it will clearly be seen that, by the employment of any material that will last equal to chilled or Franklinton iron, at the same time that it allows of turning true when uneven, and admits also of being worn quite thin before being cast aside, a really considerable margin is at once secured for the introduction, at the beginning, of crushing-faces that are in themselves more expensive. Therefore, although the first cost of steel faces is greater, there is great economy from their use. Still another point here, which should not be overlooked, is the fact of the great disadvantage of employing any material (such as chilled iron) that in wear must go from bad to worse in unevenness, until wholly unfit for use; that is, being obliged to use an imperfect roll for a long time before it can be put aside as entirely worthless.

2. The second improvement consists in the employment of steel shafts of large diameter, to prevent any spring or bending of the journal, and also to give a large bearing-surface, for enduring the great pressure on the journals. The shafts themselves, in the 26-inch roll, are $7\frac{1}{2}$ inches, and the journals $6\frac{1}{2}$ inches in diameter by 14 inches in length.

3. The improvement next to be considered is in the manner of gearing. Each of the rolls is driven, independently, by two 40-inch gear-wheels; which, again, receive their motion from two 13-inch pinions, secured upon the main shaft; one of the latter, that is to say, driving the 40-inch wheel on one side of the machine, and the other, on the opposite side, through an intermediate wheel, driving the second 40-inch wheel. The intermediate wheel, seen in Fig. 1 below and at the right, turns on a heavy pin, which is so arranged as to allow it to be lowered at pleasure. Accordingly, when the rolls wear, upon dropping the intermediate wheel, the movable roll (that to the right in the figure) can be drawn toward the fixed one (that to the left) by screwing upon the tie-bolts; and, the rolls having been thus again adjusted, the intermediate wheel is then also adjusted, to mesh properly with the large wheel. The left-hand roll, remaining stationary, is consequently at all times in proper gear; so that, by being able to adjust the right-hand roll, we secure perfect-fitting gear in all stages of the wear to which the rolls are subjected.

4. Another advantage is secured in the use of the cast-iron cups, which I have provided, placed under the nuts or heads of the tie-bolts; so that in case any undue strain should occur, as from the falling of iron, &c., between the rolls, these cups will first break, and thus prevent accidents otherwise possible, in the way of straining or

fracturing of some important part of the machine. Duplicate cups also are provided for such an emergency. I deem this an important improvement over the employment of rubber springs and weighted levers; since, while accidents are not very liable to occur, we by this means secure evenness of crushing, and save in time by crushing the ore at once, instead of being obliged to pass and repass through the rolls the same material; but when considered advisable springs may be employed, as shown in the figures. The importance of having rolls immovable when doing their regular and legitimate work, and also having them as true as possible, will be understood when we remember that all the ore which passes the rolls not crushed fine enough must pass over the screen and return to the rolls again—perhaps over and over again. Of course any unevenness or moving back of the rolls allows the material to pass untouched, and the screens, which are the most expensive to keep in repair, are worn out for no purpose, as well as the mill generally. The fact is, the very best machinery for crushing, and also for screening and concentrating, with the very best mechanical skill to operate the same, will be sure to pay the largest dividends.

5. The wrought-iron tie-bolts take all the strain due to crushing the ore, thereby securing the greatest strength with the least weight.

6. The sixth improvement consists in mounting the whole machine on a substantial cast frame, serving in a manner to render the machine complete within itself.

In addition to such improvements in the machine, I have provided, to be attached to the latter, a slide-rest, which, whenever the steel rings become worn uneven, is brought into use for turning them true again.

Durability of steel crushing-rolls.—Regarding the durability of steel crushing-rolls, although limited data can be furnished, as their introduction is of recent date, yet the data furnished indicate clearly the value and economy in using steel rolls. It was found, after crushing 2,000 tons of hard quartz at the dry concentrating-works at Star Cañon, Nevada, employing two sets of steel rolls, that their faces had worn one-quarter of an inch, reducing the diameter of the rolls one-half inch.

The steel tires are 26 inches in diameter, by 15 face, and 2½ inches thick, consequently—

	Pounds.
½ inch wear on each tire equals	85½
½ inch wear on four tires equals	342

Therefore, in crushing 2,000 tons of hard quartz, 342 pounds of steel were consumed, equal to $\frac{1}{100}$ pounds per ton of quartz crushed. At the same rate of wear the tires of two sets of rolls will crush 13,000 tons of quartz to pass through a 10-mesh screen to the linear inch.

As the tires (like shoes and dies of stamps) cannot be entirely worn out, in the above calculation I have allowed 648 pounds as the weight of metal not worn. This added to the actual wear will amount to $\frac{1}{100}$ of a pound per ton of ore crushed.

Therefore, in wear of crushing faces, the comparison will stand as follows:

In the first example, stamps require 3 pounds of metal per ton of ore crushed, which, at 6 cents per pound, equals	18 cents.
And in the second example, as furnished by Professor Trippel, the cost per ton for crushing Austin ore is	85 cents
Rolls required $\frac{1}{100}$ pound of steel per ton of ore crushed, which, at 16 cents per pound, equals, but not quite	4 cents.

Of the steel rolls used at the Star Cañon Mill, before referred to, Superintendent T. G. Negus says: "The rolls have worn better than I had any reason to expect. In working about 2,000 tons of ore we have turned them but once, and there is not to exceed ½ inch worn away. I would judge a set of rings would be capable of working at least 10,000 tons of ore."

It will be within bounds, I think, to estimate that the tires of two sets of steel rollers, of the size mentioned, will be capable of crushing 12,000 tons of quartz fine enough to pass a screen of 100 holes to the square inch, and of ore of less hardness the same tires will crush at least 20,000 tons.

It will also be admitted that the breakages and the power consumed in doing the same amount of work, are very much greater with stamps than with crushing-rollers.

In the case of stamps, probably not more than half the power is consumed in useful effect; for example, the full amount of power is exerted in running the stamps, whether crushing any ore or not, and this, together with the fact that the stamps must fall part of the time on no ore at all, and often on ore already fine enough, shows clearly that the principle on which the stamps operate is defective; whereas in the case of rollers the power consumed is in proportion to the work done. If no ore is fed to them, the only power wasted is in overcoming the friction of the machine, and all ore reduced fine enough is never operated upon the second time. So if we should only realize for a moment the difference in the principle and the operation of the two machines, we would need no figures to demonstrate the economy in favor of rollers, either for crushing fine or coarse.

CONCENTRATION.

The mechanical concentration of ores is entirely based on differences of specific gravity, and the subject to be considered is the best means, practically and theoretically, to render available, for the separation of minerals from their accompanying gangue, whatever difference of specific gravity may exist.

Opinions differ, even among the learned, in regard to the process and the kind of machines best adapted for the separation of ores, and whether air or water is the best medium, since ores cannot be concentrated except through the agency of some fluid medium which offers resistance to the force of gravity. No principle has yet been discovered which is better adapted to the separation of minerals than the intermittent and impulsive action of some fluid medium on the crushed ore. The best results thus far obtained are from machines known as "jigs," which employ the above principle.

The reason why intermittent impulses, (of a fluid medium,) caused to act on the bed of crushed ore, prove more effectual in separating the minerals contained in it than do other methods, is found in the following facts: The ore is in this way subjected to repeated liftings and fallings before passing from the machine; the particles meanwhile constantly change position, so as to present the most favorable surfaces to the action of the medium. Again, in well-regulated "jigs," the impulses are given suddenly, having the effect to impart to the ore a succession of quick and sharp blows, lifting the lighter particles of gangue more freely than the heavy mineral; and finally, the action loosens and stirs up the mass of ore, and so favors, to a small degree, the gravitation of all heavy particles to the bottom, and the forcing to the surface, at the same time, the lighter material.

Similar results might be obtained (in separation of minerals) providing the ore particles were of some regular shape, by throwing them with great velocity, so as to send them quite a distance. It will be understood that the heavier the particles the greater distance they will be thrown; and the greater the projecting force, the greater will be the distance of the gangue from the mineral. If thrown with less violence, the nearer together will the ore and gangue fall. On the above principle, the machine spoken of acts, viz: At each impulse of the ore by the fluid medium, the gangue, or lighter portion, is lifted further or higher than the mineral, or heavier portion; and, by the successive liftings, the gangue is entirely separated, and the more sudden the impulses the more decided, complete, and rapid will be the separation. The intermittent and sudden lifting of the ore better facilitates the separation of *irregular-shaped* grains than any other kind of action.

The next branch of the subject which I will consider is, whether air or water is the best medium.

Those who believe water to be the best medium, advance the theory, and on which they found their conclusions, that "the most favorable possible condition under which ore could be dressed would be to have the valuable portion of the ore possessed of a specific gravity greater than the liquid in which the dressing is to be performed; and the worthless portion of a specific gravity less than that of the liquid. For example, let us suppose that an ore consisting of galena, the specific gravity of which is $7\frac{1}{2}$, and quartz of the specific gravity $2\frac{1}{2}$,—so finely crushed that each particle consisted of one of the minerals alone—to be located first in a liquid of a specific gravity 5. It is evident that the quartz would remain floating on the surface, while the galena would be found at the bottom of the vessel containing the liquid. Practically, however, it would be found that pieces consisting partly of galena and partly of quartz, and whose specific gravity was less than that of the liquid, would remain floating, because it would be practically impossible to separate the minerals entirely by crushing, and fulfill one condition of our problem. It is evident, therefore, that if, even in the most favorable condition we can possibly imagine, the mechanical mixture of the ore is such that we can never divide it into pieces consisting entirely of one mineral, we cannot hope, by the ordinary appliances of dressing ore, to be able to achieve perfect results. Worthless and valuable minerals can never be entirely separated when they occur mixed together in an ore." * * * "Water and air are the most convenient and the cheapest media in which separation of ores can be made, and both of them have been employed for the purpose. The specific gravity of water, however, approaches more nearly to a mean between the specific gravities of ore and the accompanying gangue, and offers much more resistance to the action of gravity, and for these reasons it has generally been preferred to air, except for the dressing of certain ores." * * * —*U. S. Commissioner Raymond's Report, 1873, pp. 427, 428.*

It is assumed that the only difficulty in the way of making a successful separation of ores, by means of a liquid of intermediate specific gravity, arises from the fact that "it would be practically impossible to separate the mineral entirely by crushing," &c., whereas in the first place the whole theory is fallacious; and in the second place, if the theory were correct, the irregular shape of the grains would make the separation of ores by such a medium impossible. To demonstrate the fallacy of the theory, I will note a few examples, viz: Cubes of lignum-vitæ (specific gravity 1.333) will readily

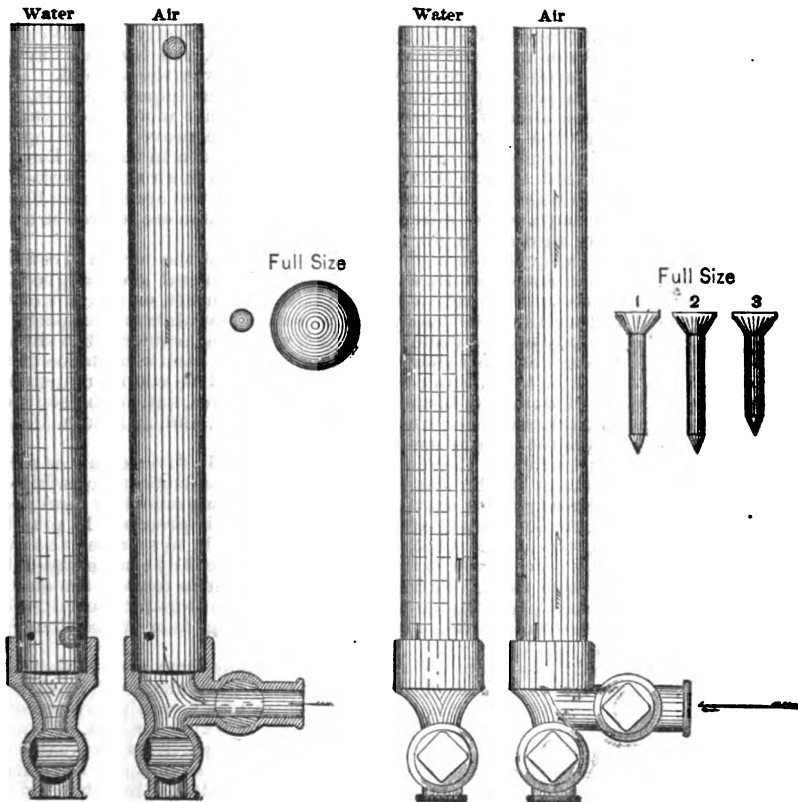
sink in water, while flat pieces will as readily float. Again, small cubes of pure gold and also of platinum will float on mercury. Mercury possesses a specific gravity of 13.580, gold 19.361, and platinum 22.069. Another example where a denser body will float on a less dense body is the case of cast iron floating on molten iron; and also, the well known tendency of substances when finely divided to lie on the surface of a liquid of less specific gravity.

So I think by these facts it can be demonstrated that dense liquids are the least suited as a medium for the concentration of ores. In the case of platinum and mercury we have a difference of 9 in specific gravity, which is a greater difference than what is named in the paragraph quoted as sufficient to cause separation.

In order to make another demonstration clear, which will prove the superiority of a less dense medium for the separation of ores, I again quote a paragraph from same report of United States Commissioner Raymond, of 1873, page 432:

"From a comparison of the ratio between the volumes and absolute weights of equal falling spheres of galena and quartz, in water and in air, it will be seen that in order to do good work with any machine for either wet or dry concentration, a previous accurate sizing of the stuff to be treated is necessary. More particularly is this the case in the dry process, for the difference in the size of equal falling bodies of different densities in air is so much less than in water. A quartz sphere must be four times as large in diameter, contain 68 times the volume, and weigh 23 times as much as a galena sphere that behaves in similar manner, in falling through a column of water. But in air the sphere would only have to be 2.8 times as large in diameter, contain 24 times the volume, and weigh 8.37 times as much. In either case, however, the importance of a careful sizing is at once apparent."

In the foregoing paragraph it is again asserted that water has a greater margin for separating ores than air, but practical results of dry concentration prove the reverse to be the case; and besides, some experiments lately instituted demonstrate, theoretically, that in air we have the greatest margin for separation.



Experiment on the fall of bodies in water and in air.

To illustrate this theoretically I erected two glass tubes, each 2 inches in diameter and 8 feet high. One of these tubes I filled with water; through the other I forced a

regulated blast of air. I found that, practically, as above stated, $\frac{1}{4}$ inch globule of galena, and $\frac{1}{4}$ inch globule of quartz, fall in equal time in the column of water. But when the blast of air was regulated to retard the galena in falling to the same extent as water, then the $\frac{1}{4}$ of quartz was sustained by the blast of air, and did not fall, while the galena fell as rapidly as in the tube of water. I also employed bodies of other forms, such as shown in the cut marked 1, 2, and 3.

In experimenting with these I regulated the current of air in the air-tube, to give the same resistance as water would to the falling bodies of equal weight and size, so that when I let fall two of equal weight and size, (1 and 2,) one in the water, the other in the current of air, both reached the bottom in equal time. I then let fall No. 1 and 3 in water, and when No. 1 reached the bottom No. 3 was about 10 inches behind; and next I let fall the same No. 1 and 3 in air; No. 1 fell in the same time in the air as it did in the water, but No. 2 did not fall at all. Thus demonstrating that instead of less margin, we have in air a much greater margin for separating ores than in water. Before making these experiments I expected to find a margin for separating ores in favor of air, but did not anticipate it would prove so great. But the experiment proved that $\frac{1}{4}$ globule of galena, and $\frac{1}{4}$ of quartz, which are equal-falling in still or moving water, can be separated by air. The results correspond exactly with the results obtained in practice—viz, that with less sizing, better results can be obtained with air than can possibly be reached with water. It should not, however, need the experiments just related to prove that air is the superior medium, for it should be understood by simple reference to what is already admitted in regard to the theory of concentration, viz, the requirements to effect separation are, first, differences of specific gravity; second, a proper agitation of the crushed ore by a fluid medium, so as to force the lighter gangue to the surface and allow the heavier to sink or remain at the bottom.

I need only discuss the latter condition. If air would not properly agitate or lift the ore intermittently, then air would be out of the question. But air is made to act upon the crushed ore so as to suspend it intermittently, in rapid succession, or a continuous blast will carry all before it just as a stream of water would. Therefore we have in air a medium which will act with sufficient force and power to properly agitate, suspend, and lift the ore, and, on account of its small density, the ore can be lifted and allowed to subside from 420 to 500 times per minute, and the medium does not, like water, afford a current or stream sufficient to carry away the mineral.

Another fact may also be properly mentioned, which is of some importance, viz, that dry ore particles in the operation of separation slide by each other more freely, that is, with less friction in air than they do in water. This may be proved by noting the angle at which a pile of dry ore will rest in air, and the same ore in water. Dry ore, sized between 10 and 20 mesh screens (to the linear inch) rests in air at an angle from base of 35 degrees, but in water at 2 degrees steeper angle. If wet ore in water flowed as freely as dry ore, the buoyancy of water would cause the same ore to rest at a less angle in water, instead of a greater angle.

By reference again to the quotation made, it will be seen that the idea is given that separation is due to the difference in time of falling of the mineral and gangue after each impulse or lift, whereas the separation takes place at each lift, on account of the lighter being lifted farther than the heavy; for when the impulses are properly adjusted, the lighter is the only portion decidedly raised, while the heavier is but slightly acted upon, and the amount of separation that takes place at each subsidence of the ore is too slight, if any, to be taken into consideration. It will be readily understood, then, that the buoyancy of water can be no aid in separating ores, but, on the contrary, it retards separation by limiting the lifts to 120 per minute, and, as I have already shown, in other respects is the inferior medium.

But a still farther illustration of the remarkable difference in favor of air as a concentrating medium is found in the fact that the air-jig concentrates successfully all the crushed ore except floating dust; that is, all that is not of a grade finer than about $\frac{1}{16}$ part of an inch in diameter is successfully treated by the air-process. In practice, at first, I employed a screen of 10,000 holes to the square inch, to take out the dust. All the granular particles up to 10,000 to the square inch are readily concentrated, but lately it is found practicable to employ a gentle current of air to remove the dust, so that all grains up to at least $\frac{1}{16}$ part of an inch go to the separators for concentration. But with water it becomes difficult to concentrate, with the jig, finer grains than $\frac{1}{8}$ of an inch, (or a 12-mesh screen.)

In several tests made in concentrating unsized ore—ranging from such as delivered through an 8-mesh screen to the finest slimes or dust—I have (with Gilpin County, Col., gold-ores) found that ten per cent. of the concentrations would pass a screen of 100 mesh, or 10,000 holes to the square inch, and much of which amount, of course, would pass a considerably finer screen. Yet all these mineral particles, so greatly differing in size, can by air be concentrated at one operation, in one pile, and the gangue in another—facts which establish conclusively, and beyond contradiction, that the rule applying with water does not meet the case in dry concentration. Nevertheless, for

the best results sizing is indispensable, and I recommend the adoption of three or four grades.

So that, looking at the subject in every point of view, everything considered, both as to the results obtained practically and in a theoretical point of view, air is shown to possess superior advantages as a concentrating medium over that of water.

Superintendent T. G. Negus has furnished me the following reliable results of working three different lots of ore at the Dry Concentrating Mill at Star Cañon, Nevada:

66,800 lbs. of ore from De Soto mine, assay \$72.24	\$2,412 81
Mineral No. 1.—1,013 lbs., assay \$72.71	\$366 04
Mineral No. 2.—1,092 lbs., assay \$1,187.57	648 40
Mineral No. 3.—515 lbs., assay \$1,204.54	305 35
Dust from bin, 11,998 lbs., assay \$138.17	828 88
	2,148 67

Or 89.05 per cent. saved.

38,150 lbs. Sheba ore, assay value per T., 56.72	1,081 93
Mineral No. 1.—1,072 lbs., assay \$441.09	\$236 41
Mineral No. 2.—1,077 lbs., assay \$559.86	301 48
Mineral No. 3.—664 lbs., assay \$780.40	251 28
Dust from cham. 2,881 lbs., assay \$96.56	139 09
	928 26

Or 86 per cent. saved.

3,260 lbs. Seminole ore, assay value per T., \$4.84	7 88
Mineral No. 1.—55 lbs., assay \$32.32	\$0 88
Mineral No. 2.—49 lbs., assay \$46.87	2 12
Mineral No. 3.—48 lbs., assay \$135.10	3 24
	6 24

Or 80.47 per cent. saved.

Mr. Negus says: "I inclose the results of working three different lots of ore—one from De Soto, one from Sheba, and one small lot of very low grade ore from the Seminole. This I send, not that it is really of any practical value, but to show how very sensitive the machinery is in taking out the mineral where there is only the very smallest amount."

The De Soto and Sheba are the only mines in Star Cañon which furnish any ore. The ores are antimonial silver mixed with black sulphurets of silver, a class of ores exceedingly difficult to concentrate with water.

In Cornwall the concentrated tin-ores contain all the copper, iron, and arsenical pyrites. This concentrated product is charged into a reverberatory furnace and roasted, for the purpose of oxidizing the arsenical and sulphur combinations, in order to change the specific gravity. The roasted ore is again concentrated, and sometimes if the ore is very impure the roasting and concentrating is again repeated.

With air the concentration of Cornwall tin-ore is effected more completely without roasting.

Also, zinc blende is separated from galena with ease and rapidity.

Kryolite from spathic iron:

Specific gravity of kryolite	2.9
Specific gravity of spathic iron	3.9

Also the various sulphuret ores of silver, zinc, copper, and Colorado gold-ores are concentrated with a very small loss as compared with the loss following wet concentration.

Emery from quartz or iron-ore.

Coffee from stones.

Iron pyrites or nickel ores from hornblende.

Diamonds and other precious stones from sand, quartz, gravel, &c., and many other substances which have too slight a difference in specific gravity to be separated by means of water.

In addition to the advantages of saving a larger percentage of the value contained in such ores as have heretofore been concentrated by means of water, the successful separation or concentration of those which water cannot treat, and the greater rapidity of concentration, may be mentioned the greater convenience and simplicity secured in the use of air as the concentrating medium.

In some cases, no doubt, the percentage of loss in dry concentration will be greater than the results furnished by Mr. Negus. Then, again, in many cases, the loss will be less. The following example will illustrate the benefits following from dry concentration:

428 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

TABLE I.

Cost of concentrating 5 tons of ore into one ton, at \$2 per ton	\$10 00
Cost of smelting one ton of concentrated ore.....	35 00
Total cost of reducing 5 tons of ore	45 00
Cost of smelting 5 tons of ore, at \$35	175 00
A difference in favor of concentration on 5 tons of ore of.....	130 00
Hence, on 50 tons of ore per day, (the work of one mill).....	1,300 00
And on the total work of one year of 300 days, a saving of	390,000 00

Continuing the comparison between the two methods to the practical results to be secured by adopting the plan of dry concentration, I will assume that we have an ore of which the assay value is \$100 per ton, and that a concentration of 5 tons into 1 is effected. I will allow a loss of 10 per cent. in concentration, while it will be fair to assume, again, that when the deleterious gangue rock is removed, the oneton of concentrated ore can be smelted or otherwise treated with no greater loss than 5 per cent. Accordingly, bringing in the aid of concentration, we shall have the following:

TABLE II.

Original value of 5 tons of ore at \$100 per ton.....	\$500 00
Cost of concentrating 5 tons into 1, at \$2 per ton.....	\$10 00
Loss of 10 per cent. in 4 tons of tailings	50 00
Cost of smelting, &c., 1 ton of concentrated ore.....	35 00
Loss in smelting of 5 per cent. of concentrated ore.....	22 50
Total cost of treating 5 tons of ore.....	117 50
Amount left over costs of reduction	382 50

WITHOUT CONCENTRATION.

Cost of smelting, &c., 5 tons of ore, at \$35.....	\$175 00
Loss of 10 per cent. on 5 tons.....	50 00
Total cost of treating 5 tons	225 00
Amount left over costs of reduction	275 00
A difference in favor of first concentrating on 5 tons of ore.....	107 50

The above table will enable the reader to judge of the comparative cost of the two methods of treating ores.

In addition to such improvements in the machine, I have provided, to be attached to the latter, a slide-rest; this, whenever the steel rings become worn uneven, is brought into use for turning them true again.

Screens.—The plan of revolving screens is that which I have adopted, as best suited for the work to be performed; and perhaps the only features particularly requiring notice, in the department of screens, are those in respect to their systematic manufacture, and the adaptation of all their parts to the sizing they are intended to effect.

The screens are made larger at one end, in order to give the proper incline for discharging the ore, while allowing the shaft to be placed horizontal. By having the screens themselves cone-shaped, and the shafts accordingly horizontal and parallel with each other, the important advantages are secured of rendering it convenient to drive in the ordinary way by belts, and also of the facility of driving one shaft by the other, an arrangement shown in the Plan of Mill, where the lowermost one is driven directly from the main power, this in turn made to drive the next, and so on.

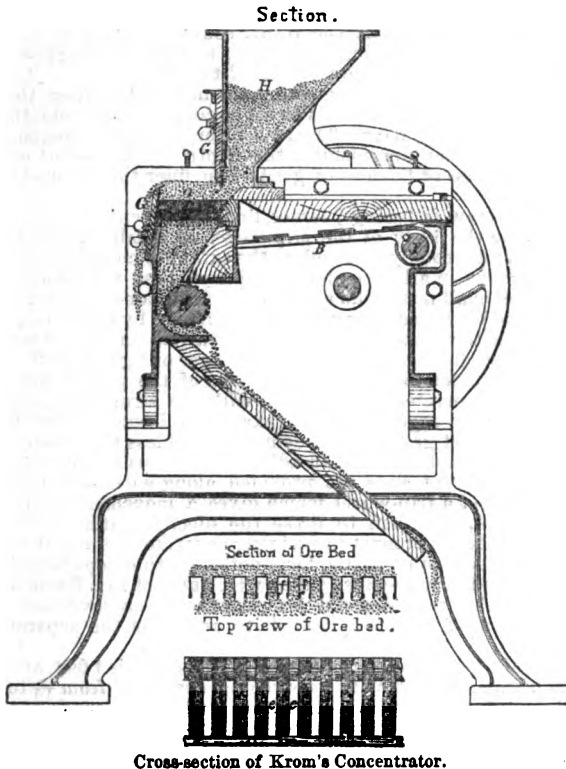
The bearings of these shafts, as with those throughout the mill, are self-adjusting; so that, in case the shafts spring or become out of line, the boxes will still bear truly on the journals.

To prevent clogging of the screen, I have arranged hammers or weights to slide on bolts hanging inside of the screen, the action of which is to jar out particles that may have stuck in the meshes. A light blow on the top of the screen serves best to loosen and throw out any particles sticking in the meshes, at the same time that (owing to some elasticity of the frame as a whole) it affects less the lower portion, as is desirable it should do, since whatever jar the screens receive when at the lowest point is likely to fasten the particles only the more firmly.

Rubber cushions or springs placed on the end of the bolt next to the screen, soften the blow of the hammer at the lower side of the screen, as shown in the cut.

The dry concentrator.—The plate accompanying this description is a transverse sectional view.

The machine is composed essentially of the following parts: A receiver H, to hold the crushed ore; an ore-bed O, on which the ore is submitted to the action of air; the two gates G G, one to regulate the flow of ore from the receiver H, the other to determine the depth of ore on the ore-bed; a passage C, in which the concentrated ore descends, and roller R, to effect and regulate the discharge of the same; a fan B, to give the puffs of air; a trip-wheel, lever, and spring to operate the fan; and a ratchet-wheel and pawl to impart revolution to the roller R.



Cross-section of Krom's Concentrator.

The mode of operating the machine is as follows: Ore is placed in the receiver H, and the driving-pulley set in motion. The trip-wheel, fixed on the opposite end of the pulley-shaft, works by its cam-shaped teeth against the lever; and by the alternate action of this wheel, forcing the lever in one direction, and of the spring, which at once and suddenly carries it back again, the fan B is made to swing on the shaft I, sending at each upward movement a quick and sharp puff of air through the ore-bed, and lifting slightly the ore lying on it. As there are six projections upon the trip-wheel, it follows that the moderate speed of 70 to 80 revolutions of this per minute will give 420 to 480 upward movements of the fan in the same time, and consequently a corresponding number of puffs of air to agitate the ore; this rate is sufficient to secure steady motion of the heavy balance pulley, and yet not so fast as to produce any unpleasant jar or noise—the machine working smoothly and easily.

The ore-bed is composed of wire-gauze tubes, placed at distances from each other of $\frac{1}{16}$, $\frac{1}{8}$, and $\frac{1}{4}$ of an inch, according to the grade of ore to be concentrated—the finer requiring that the tubes be set nearer together, while the coarser allow of their being farther apart. The ore-bed, situated in front of the fan, as plainly shown in the sectional view, is formed by these tubes—their ends next to the fan being open, and the air from the bellows, entering these, escapes through the top and sides of the tubes, agitating the ore that lies on them, and also that between them near the surface.

The ore between the tubes rests on that immediately underneath, in the passage C, and sinks as fast as the roller R, at the bottom, effects its discharge. The tubes being open on the lower side, any fine ore passing through the meshes of wire gauze simply descends with the main body C, thus preventing any liability of the tubes to filling up.

In discharging the concentrated ore C, the roller R is operated (as mentioned above)

by means of the ratchet-wheel and pawl, and, the latter being carried by a crank on the trip-wheel, it follows that its speed is governed by the speed of this wheel, which also gives motion to the fan B; by this connection the fan, which effects the concentration, and the roller, which discharges the concentrated ore, are made to act in concert with each other. The importance of this feature will be apparent, when it is remembered that the amount of ore concentrated in a given time depends on the number of puffs of air supplied per minute; so that, as the arrangement here secures, the motion of the discharge-roller should be controlled and regulated to correspond with the speed of the fan.

To accomplish more satisfactorily the result sought, the crank which carries the pawl can also be adjusted, by varying its length; so that the speed of the roller may be further regulated, according to the richness of the ore.

As already stated, the upper gate G governs the flow of ore from the receiver H to the ore-bed, whilst the lower gate G is so set as to determine the thickness of the stratum of ore lying upon the latter. The reason for this last arrangement is found in the necessity of increasing or diminishing the depth of the bed of ore operated on, according to the coarseness or fineness of grade—the finer the crushed ore the thinner should the stratum be.

The strap, with its screw fastenings, serves, first, to prevent the roller-attachment of the lever from striking the body of the trip-wheel as it falls from each of the cam-shaped projections; and secondly, to regulate the extent of movement of the fan. That is to say, the strap must in all cases be so adjusted that the small roller working against the trip-wheel shall not strike at the foot of the cam—the strap serving in this manner to cushion the blow and prevent noise. Further, by tightening up or slackening off by means of the screw-fastening, the fan is carried in its vibration through a greater or less space, producing accordingly a stronger or lighter puff of air.

It will of course be understood that the volume of the puff of air required varies with each grade of ore operated upon. Now, with the strap arrangement alone, the volume of the puff can be regulated to the exact requirements of different grades of material. But, as the finest grades of ore demand much less movement of the fan than do the coarser, it is preferable to have an additional means of control; and to supply such, trip-wheels of different sizes are provided along with each machine. It is, in working, better to select a trip-wheel which gives a movement corresponding most nearly to that required, and then to make the nicer adjustments by means of the screw and strap; but the roller must in no instance strike at the foot of the cam.

The novel features, then, to be particularly noted in this separator, are as follows:

1. The ore-bed, formed of wire-gauze tubes, which are set in a frame a short distance apart, thus allowing the ore to descend between them, is a novel and original device for securing the removal of the concentrated ore, as fast as the separation on the bed is completed.

The entire width of the ore-bed in the largest size machine is 4 feet, and along this the tubes, only $\frac{1}{4}$ inch wide, are set, with intervening spaces of from $\frac{1}{4}$ to $\frac{1}{2}$ of an inch; consequently, the total extent of openings through which the ore falls, amounts in the one case to $\frac{1}{4}$ and in the other to $\frac{1}{2}$ of the entire ore-bed. This construction gives a great amount of space through which to deliver the concentrated material, and of course distributes the discharge over such space; so that at no single point does the ore sink rapidly, and yet the action of the air is perfect and equal over the entire extent of the ore-bed.

2. The second feature in importance is the automatic discharge-roller R. This being driven by the motion that works the fan, and its rate of revolution being at the same time, and in the manner already explained, regulated according to the richness of the ore, it follows that the concentration of the material, and its discharge, are effected in concert; the result is, that when the general speed of the machine slackens, the concentration being of course less, the rate of delivery is (as it should be) correspondingly reduced.

3. The third feature is the general simplicity of the device for producing the puffs of air; namely, a fan or plate, furnished with rubber valves, swinging on its proper shaft, and directly actuated by means of a single lever L.

4. The next feature requiring notice is the combined operation of the trip-wheel and spring, in actuating the fan or bellows-plate. The wheel, by the gradual action of its cams, throws the lever L back, and consequently the fan or bellows-plate downward, with a movement as gentle as is possible for one so rapid, when, immediately after, the spring carries the fan quickly upward—the two motions, in this way, securing all the time practicable for the air to fill the space above the fan, and then the expulsion of this with a sudden impulse through the ore-bed, imparting a lift to the ore, as already explained.

The superiority of this particular device over cams, cranks, &c., arises from the fact that, with it, a considerable variation of the speed of the machine does not affect the quality of the concentration, but only the rate, and so, the quantity. If the trip-wheel revolves slowly, the number of vibrations of the fan is of course less; but as the

spring causes the upward movement, the puff of air is of practically uniform strength, and we thereby obtain at all speeds what we may term a concentrating stroke of the bellows.

The more sharply or distinctly the jets of air are given, the more perfect and well-defined will be the separation, and the greater may be the varying sizes of the grains. And the more rapidly in succession are the jets of air repeated, the greater will be the amount of work done in a given time.

5. In reference to the action of the strap and adjusting-screw, although in itself important, the explanations already presented are deemed sufficient.

6. The gate on the hopper H compels the ore to flow on the ore-bed as an under-current, and as the puffs are regulated to agitate just perceptibly the heavy portion of the material, it follows that only the lighter portion will rise to the surface and be thrown (as tailings) over the lower gate G, while the heavy continues to sink through the ore-bed, and to be discharged below.

This feature of the under-flow of ore, just mentioned, enables us to concentrate perfectly with a very short travel of the material, or, in other words, to employ a short ore-bed, a condition of things which proves for several reasons of great advantage, viz :

By thus having a short ore-bed, we are allowed to extend what we can properly term the width of the bed, thereby greatly increasing the capacity of a machine of given size. All other experimenters have caused the delivery and discharge of the ore to take place over the shorter dimension of the machine, and the travel of the ore over the longer dimension; the exact reverse of this is secured in the machine here described, viz, the distance of travel of the ore over the bed is only 5 inches, while the line of overflow is extended to 4 feet, or can be at pleasure made still greater.

Again, a short ore-bed enables us to use a small fan or bellows; thereby reducing the size of the machine, as also the power required to run it, and the vibration attending rapid movement.

Finally, a more even and uniform agitation is secured, when the ore is confined within narrow limits; and consequently, more satisfactory results are for this reason also obtained.

7. The feature last considered leads us naturally to the shape of the machine. Since I have discovered that a short ore-bed, of only 5 or 6 inches length, is *not only sufficient, but in fact much superior*, for the purposes required, and that the width of the bed and extent of overflow can accordingly be greatly increased, thus largely increasing also the amount of concentration for a given size of machine, I am able so to place the fan and to group in compact form all the working parts, as very considerably to reduce the entire bulk of the machinery and frame, the whole being kept to a small and convenient size, in comparison with the amount of work performed.

8. The frame is made deep, and provided with a door to inclose the principal working parts, a feature, however, which is not considered essential.

Before leaving the subject of the concentrating-machine, attention should further be called to the fact, that with it the puffs of air, in agitating or lifting the ore, effect at the same time the delivery of fresh supplies from the receiver, and help to force the tailings over the lower gate, G.

The puffs of air are, at the start, regulated to agitate sufficiently the ore on the bed; but should the richness of the latter increase during working, or too large a supply collect at one time on the bed, the air ceases to lift or agitate the material so much as before; and thus a check is at once furnished to prevent loss by the overflowing of heavy ore in the tailings. No such check is possible in water concentration; because water moves practically as a solid, and carries all before it.

All the parts in this machine liable to wear in the course of time are manufactured to duplicate, and accordingly can be cheaply replaced.

The machine measures 6 feet in length over all, 3 feet in width, and 3 feet 10 inches height. It weighs, complete, 1,200 pounds, and is capable of concentrating $\frac{1}{4}$ ton per hour with $\frac{1}{2}$ horse-power. Besides the large machines, I manufacture smaller ones, of the weight of 150 pounds, for the requirements of laboratories and of mining prospectors.

DESCRIPTION OF MILL FOR DRY-CRUSHING AND CONCENTRATION OF ORES.

The accompanying plan of mill showing the best arrangement of the machinery for crushing, screening, and concentration of ores is designed with a view to economize in the labor and expense required to operate it.

In this plan some of the economical features introduced in practice are not shown for the purpose of better illustrating clearly the operation simply of crushing, sizing, and concentrating, including the means of drying the ore.

One important feature omitted is that for weighing after drying and crushing just previous to sizing. The plan adopted is simple and saves a great deal of trouble and expense, and secures greater accuracy in the weight of ore treated.

The mill is represented as built on the slope of a hill or mountain side, a course

securing some conveniences. By this plan the ore is delivered in the third story, and at this point fed to the jaw-crusher, which breaks the ore into small fragments.

The ore thus broken falls into the drying-oven to release it from outside moisture.

The drying-oven is made of cast iron. The bottom, as plainly represented, is arranged in step fashion, so as to allow the hot air or fire to pass up through the spaces between the ore. It will be readily understood that such a system of drying will secure the most rapid and economical results. The heat, after it passes through the ore with the moisture it carries, is conducted away through a flue or pipe in the ordinary way.

At the bottom of the dryer is arranged a shute, capable of being adjusted at such an angle as just to deliver the ore to the endless belt in a comparatively thin stratum. This belt is adjusted in speed to carry the ore away from the dryer and deliver it to the first pair of rolls at the same rate it is fed to the crusher. If feeding at the crusher is stopped, the carrier belt should also be stopped, as it is essential to have the dryer always quite or nearly full. A shifting belt, which is under the immediate and easy control of the man at the crusher, supplies the means of starting and stopping the carrier-belt at pleasure.

The dryer will hold about $1\frac{1}{2}$ tons, so, at a rate of crushing equal to 3 tons per hour, the ore will be half an hour traveling through the furnace, a space of time believed to be quite (and more than) sufficient to dry it.

After passing between the first pair of rolls the crushed ore (now about the size of corn) flows to the screen, and all that is fine enough taken out and allowed to flow at once to the elevator.

The coarse portion flows, by means of properly arranged and adjusted shutes, to the second pair of rolls, which complete the crushing.

The object in taking out the ore which has been crushed sufficiently by the first rolls is twofold, namely: The portion already so reduced should be saved from further crushing, to prevent making too much fine stuff; and, secondly, as each machine is adjusted to crush finer than the one preceding, it is not capable of operating on the same weight or bulk of ore. The elevator delivers all the crushed ore to the uppermost screen, which takes out any particles that may still be too coarse, such small percentage of coarse product being sent back through a shute (shown in the plate) to the first pair of rolls for recrushing. The portion passing through the meshes of the first screen flows to the second, and so much as goes through the second screen again to the third, and so on.

From the larger end of the second screen we get the first or coarsest grade of ore for concentration, and which flows to the bin. From the end of the third we obtain the second grade, and that from the end of the fourth screen is the third grade, and what passes through the meshes of the fourth screen is the fourth grade of ore, making in all 4 sizes, each size flowing to one of the four bins.

From the bins the ore flows directly downward to the separator, situated on the floor below.

The tailings from the first eight separators are removed by any convenient means from the building, but the concentrated ore, with some gangue with it, flows to the concentrators on the basement-floor, where it is reconcentrated to remove all the gangue.

In practice it is found to be more convenient and economical not to concentrate too highly in the first operation, but to allow some gangue to go with the concentrated mineral. If the mineral contains some gangue it is an evidence there is no loss of valuable ore going off with the tailings, so the rich concentrations are allowed to flow to a single set of machines below, and there reconcentrated.

In this operation is obtained a pure concentrated mineral and a small amount of rich tailings, but this latter (rich tailings) is sent back by the elevator to be concentrated over again on the machine above.

A few hours of the 24 is sufficient time to do all the reconcentrating, as the bulk, compared to the original ore, is greatly reduced.

This system of reconcentrating renders good concentration easy, serves as a check to loss in the tailing, and proves economical in practice.

The dust made by crushing is withdrawn through properly arranged dust-pipes. The exhaust-fan for removing the dust is connected with a main dust-pipe (not shown) placed against the elevator trunk, and all dust-pipes from crushers, separators, and screen-chambers lead into the main pipe.

The screens are provided with latticed hoppers, which allows a current of air to flow freely up through the screen-chambers, which removes the floating dust, but all which does not float in a gentle current flows to the bins, so that all grains not finer than $\frac{1}{16}$ part of an inch are concentrated. Each chamber is connected by separate dust-pipes directly with the main tube.

The dust withdrawn from the various parts of the mill is conveyed through a tube and carried outside of the building some distance away to a dust-chamber, as shown in the cut, where nearly all of it is settled and saved for subsequent treatment.

The importance of saving the dust, as well as the importance of making as little as

possible in crushing, will be appreciated when it is understood that all the dust of ore assay always about double the value of the original in base and precious metals.

In order to produce as little dust as possible, in crushing at the rate of 2 to 2½ tons per hour, 2 sets of rolls are indispensable and even 3 sets preferable and more economical. In this way the ore is brought gradually from coarse lumps to fine sand.

The machinery throughout the mill is of the best possible workmanship; and each machine employed is constructed on the best known mechanical principles. No pains or money have been spared to bring each machine or other parts to a condition of working perfectly with all the rest, and also with the highest efficiency.

The mill, constructed and fitted up as shown in the plan, is capable of crushing and concentrating at the rate of from 2 to 3 tons per hour.

Machinery and plans for mills of less or greater capacity will be furnished as may be required.

The number of men required to keep in operation a mill crushing and concentrating at the rate of 3 tons per hour, and when steam is the motive power, is 6 men for day-work and 3 for night-work; and when water is the motive power, 5 men for day-work and 2 for night-work.

In Galena, Battle Mountain district, Nevada, as I learn from a report received since the preparation of the chapter on Nevada, (see page 172,) the White and Shilo Consolidated Company* had a Krom concentrating-mill built last summer by the Krom Concentrator Company, to dress the low-grade ore that had accumulated on the dumps of the mines. The ore consists of graywacke slate as a gangue, and contains sulphurets of silver, lead, iron, zinc, &c., with hardly any quartz. The machinery is propelled by a steam-engine, and works 40 tons in twelve hours, concentrating about 5 tons of rock into one. These concentrates contain about 30 per cent. of lead and about \$130 silver per ton. There being no drying-kiln connected with the mill, the wet weather, coming in October last, forced the mill to stop. While operating the mill ran only twelve hours during the twenty-four, and about 500 tons of concentrations were shipped from Battle Mountain to San Francisco. The White Mine was worked about three months during the year, with only a few hands.

* I believe this is the company called on page 172 the Battle Mountain Company.—
R. W. R.

CHAPTER XVI.

THE ACTION OF SMALL SPHERES OF SOLIDS IN ASCENDING CURRENTS OF FLUIDS AND IN FLUIDS AT REST.

By J. C. BARTLETT, A. M., *Cambridge, Mass.*

The following discussion* was suggested by an experiment of Mr. Krom, the manufacturer of air-jigs, to illustrate the superiority of air over water as a medium of concentration. The paper is written in the interest of no system of concentration, but simply to test the experiment, and, perchance, to add something to the general fund of information on the subject.

To speak of testing an experiment by a theoretical discussion may seem a misuse of terms, but the theories concerning falling bodies and the resistance of fluids are pretty well crystallized into laws, which may properly be used to show where experiments which seem to refute them were improperly performed, and that instead of refuting they only corroborate.

It is well known that a sphere of galena $\frac{1}{8}$ inch in diameter and a sphere of quartz $\frac{1}{4}$ inch in diameter are equal-falling in water; that is, these two spheres, being placed together in a column of water at rest or in motion, will practically remain together, falling or rising together or remaining in suspension. Mr. Krom, to show that these spheres could be separated in a current of air, and hence, as he supposes, to show that air is a better medium for separation than water, performed the following experiment. He says: "I erected two glass tubes, each 2 inches in diameter and 8 feet high. One of these tubes I filled with water, through the other I forced a regulated blast of air. I found that, practically, as above stated, $\frac{1}{8}$ inch globule of galena and $\frac{1}{4}$ inch globule of quartz fall in equal times in the column of water. But when the blast of air was regulated to retard the galena in falling to the same extent as water, then the $\frac{1}{4}$ of quartz was sustained by the blast of air and did not fall, while the galena fell as rapidly as in the tube of water."

It is a very remarkable coincidence that the quartz ball should be exactly held in suspension and the galena ball should be caused to fall in exactly the same time as in water by the same blast of air. It might be supposed that the quartz ball, the two balls being transferred from water to air, losing so much more sustaining force due to the buoyancy of the water than the galena, would tend to fall faster than the galena ball, and hence that a blast of air which held the former in suspension

*This mathematical discussion of the phenomena described by Mr. Krom in the preceding chapter was promised for the present report by Mr. Bartlett, but not received until the pages were in press. Like many other valuable contributions to this and former reports, it was also intended as a paper for the American Institute of Mining Engineers. The delay in the publication of the present volume has brought it to pass that several of its chapters have already appeared in the proceedings of that society. But they are not on that account any less valuable to the public for which these pages are intended.—R. W. R.

would cause the latter to rise. On the other hand, the sustaining force due to the velocity of the air would be much greater in the case of the quartz than the galena, so that a blast of air which would hold the former in suspension might allow the latter to fall. What the actual result would be can only be determined by a consideration of all the conditions together, and will appear from the following investigation.

In Rittinger's treatise on ore-dressing the following formulas are deduced for spherical solids in a rising stream of water. They are equally true for any other fluid, if we make the proper change in A and B for difference of density:

$$(1) v = -\frac{A^2 C^2 - 1}{A \left(\frac{\epsilon^{2Bt} + 1}{\epsilon^{2Bt} - 1} + AC \right)}$$

$$(2) s = \frac{AC + 1}{A} t - \frac{1}{AB} \log \frac{(AC + 1) \epsilon^{2Bt} - (AC - 1)}{2}$$

In (2) the logarithm is the Napierian, C is the velocity of the ascending current of fluid, v the velocity of the sphere at the end of t seconds, s the distance upward passed over by the sphere in t seconds,

$$A = \sqrt{\frac{3aJ}{2d\gamma(\delta - J)}} \quad B = \frac{g(\delta - J)}{\delta} A.$$

In these values of A and B , $a = 25.5$, a constant determined by theory, and verified by experiment, being the force in kilograms exerted on a surface one meter square by water flowing directly against it with the velocity of one meter per second; J is the density of the fluid, δ the density of the sphere, γ is 1,000, the weight in kilograms of one cubic meter of water; g is the acceleration due to gravity, or 9,809 meters; d is the diameter of the sphere in meters, and ϵ is the Napierian base, or 2.71828. The reproduction of these formulas is somewhat lengthy, though not difficult, and will therefore not be given here. The reader who wishes to satisfy himself as to their correctness is referred to the above-mentioned work. From them simpler formulas for special cases will be deduced. The contraction $\log$. indicates the Napierian logarithm.

If in (1) $C = 0$, or the fluid is at rest, we obtain

$$(3) u = -\frac{1}{A} \frac{\epsilon^{2Bt} - 1}{\epsilon^{2Bt} + 1},$$

and if 1 is very small compared with ϵ^{2Bt} , we obtain from this

$$(4) v = -\frac{1}{A}.$$

If in (1) 1 may be neglected in comparison with ϵ^{2Bt} , we obtain

$$(5) v = -C \frac{1}{A}.$$

If in (1) $v = 0$, or the sphere is held in suspension in the fluid, we have

$$(6) C = \frac{1}{A}.$$

If C is greater than $\frac{1}{A}$, v is positive, and the sphere rises. If C is less than $\frac{1}{A}$, v is negative, and the sphere falls. If in (2) $C = 0$, we obtain

$$(7) s = -\frac{1}{AB} \log \frac{\epsilon^{Bt} + \epsilon^{-Bt}}{2}.$$

If we solve this for t , we get

$$(8) t = \frac{\log (\epsilon^{-sAB} + \sqrt{\epsilon^{-2sAB} - 1})}{B}$$

If in (8) 1 may be negatived in comparison with ϵ^{-2sAB} , which is generally the case in practice, s being negative when $C = 0$, we obtain

$$(9) t = \frac{\log. 2}{B} - sA.$$

If in (2) we neglect $AC - 1$, which is generally small compared with $(AC + 1) \epsilon^{2Bs}$, and solve for t , we get

$$(10) t = \frac{\log. \left(\frac{AC + 1}{2} \right) + sAB}{B(AC - 1)}$$

and if in (10) $C = 0$, it reduces to (9). By approximations (2) may be reduced to

$$(11) s = \left(C - \frac{1}{A} \right) t,$$

or, for those cases where the velocity of the sphere may be regarded as constant, we may write $s = vt$, and take the value of v from (5), thus obtaining (11).

For small spheres falling or rising in water, all the approximate formulas are accurate enough, but not always so when the fluid is air, and they must be used with caution. In the consideration of particular cases we shall see to what extent the approximate formulas are trustworthy. For the sake of clearness and brevity, the discussion is put in the form of problem and answer, all the work of computation being omitted. In the following cases the densities of water, air, quartz, and galena are taken as 1, 0.00125, 2.6, and 7.5, respectively.

I. What must be the velocity of an ascending current of air to keep in suspension a quartz ball $\frac{1}{2}$ inch in diameter? From (6) we find $C = 86.2$ feet per second.

II. What will be the action of a galena ball $\frac{1}{2}$ inch in diameter in an ascending current of air having a velocity of 86.2 feet per second? For the galena ball the value of $\frac{1}{A}$ is 73.21; hence C is greater than $\frac{1}{A}$ and the galena will rise with an increasing velocity, the limit of which is $C - \frac{1}{A}$ or 13 feet per second.

III. In what time will a ball of galena $\frac{1}{2}$ inch in diameter fall 8 feet in water at rest? From (11) we get $t = 3.32$, and from the more exact formula (9) $t = 3.38$. As in this case $-2sAB = 76.8$, we see that 1 may be omitted under the radical sign in (8), and (9) may be used without appreciable error. By applying (9) to the case of a quartz ball $\frac{1}{2}$ inch in diameter falling with the galena, we find $t = 3.43$, a difference of 0.05 second. A part of this difference is due to the fact that the two balls are not exactly equal-falling theoretically, the ratio of the diameters of equal-falling spheres of quartz and galena being 4.0625:1, and not 4:1, as assumed. If we substitute the ratio 4.0625:1, we get $t = 3.40$ instead of 3.43. The rest of the slight difference is easily accounted for by explaining the meaning of equal-falling bodies. Two equal-falling

bodies are not necessarily two bodies which fall from rest through the same distance in the same time; but they are two bodies such that the limit of the velocity which they acquire by falling from rest in any fluid is the same for both. This limit of velocity is found by making t infinite in (1), and is $C - \frac{1}{A}$ or $-\frac{1}{A}$ if $C = 0$. To illustrate this point

with another example, it may be asked:

IV. What will be the velocity of an ascending current of water to keep in suspension a $\frac{1}{2}$ -inch galena ball, and what will be the action of a $\frac{1}{2}$ -inch quartz ball in this stream of water? From (6) we find that the velocity is 2.41 feet per second, and from (5) we find that the quartz ball would rise, its maximum velocity being 0.0187 foot per second. Practically, of course, they would remain together. If we reverse the problem, asking the velocity necessary to keep the quartz ball in suspension, we find 2.39 feet per second, and that the galena will fall with a maximum velocity of 0.0187 foot per second.

V. What will be the velocity of an ascending current of air to keep a $\frac{1}{2}$ -inch galena ball in suspension, and what will be the action of a $\frac{1}{2}$ -inch quartz ball in this current? By (6) we get, as before, 73.21 feet, and if we substitute this value in the exact formula, (1), with the proper value of A , we find:

When $t = \frac{1}{2}$	$v = -$	3.83.
When $t = 1$	$v = -$	6.57.
When $t = 2$	$v = -$	9.82.
When $t = 4$	$v = -$	12.28.

The limit which v continually approaches, and practically reaches after a few seconds, is -12.98 . This illustrates how soon, even in air, the velocity of small spheres becomes practically constant.

VI. What will be the diameter of a galena ball which will be held in suspension by an ascending current of air which will sustain a quartz ball $\frac{1}{2}$ inch in diameter; that is, having a velocity of 86.2 feet per second? Solving (6) for d , which is contained in A , we get $d = 1.386$ eighths of an inch.

VII. What is the diameter of a galena ball which, in an ascending current of air which keeps a quartz ball $\frac{1}{2}$ inch in diameter in suspension, will fall with the same velocity as in water at rest? If we assume that the velocity has become practically constant, we may employ (5) to solve the problem. For the galena falling in water at rest we have,

$v = -\frac{1}{A}$, which may be written $-\frac{1}{A_w}$, the subscript w denoting that

A is taken with reference to water. In the same way we shall have A_* for A taken with reference to air. Hence, (5) will become

$-\frac{1}{A_*} = C - \frac{1}{A_*}$ or $\frac{1}{A_*} - \frac{1}{A_w} = C$. Solving this for d , which is con-

tained in A_* and A_w , we get $d = 1.48$ eighths of an inch.

VIII. What is the diameter of a galena ball which, in an ascending current of air which keeps a $\frac{1}{2}$ -inch quartz ball in suspension, will fall from rest through 8 feet in the same time it would fall 8 feet in water at rest? Formula (2) is the one to apply to this question, A and B being functions of the required diameter, and s , C , and t being given: $s = 8$ feet, $C = 86.2$ feet, $t = 3.38$ seconds. In this case $AC - 1$ may be

neglected, and we may employ (10). Though we cannot solve this last question directly for d , we may find the value of d by approximations, starting with the value obtained in the preceding question.

Solving for s we have

$$(12) s = \left(C - \frac{1}{A} \right) t - \frac{1}{AB} \log. \left(\frac{AC+1}{2} \right)$$

In this the value d , 1.52 eighths of an inch, gives $s = 7.996$, instead of 8 feet as given in the data. This answer, 1.52 eighths inch, is practically the same as that found in the preceding question, 1.48 eighths inch. The difference between the two questions should be noticed, and the reason why d should have a little larger value in the latter will be understood upon a moment's reflection.

IX. What will be the velocity of an ascending current of air in order that in it a $\frac{1}{2}$ -inch galena ball shall fall 8 feet in the same time as in water at rest? Taking formula (12) and substituting the known values of A , B , t , and s , we find $C = 69.62$ feet.

X. In what time will a $\frac{1}{2}$ inch quartz ball fall 8 feet in an ascending current of air, having the velocity of 69.62 feet per second? From (10) we obtain $t = 0.9209$, or nearly one second.

XI. Compare the velocities of spheres of galena and quartz falling in an ascending current of air having a velocity of 20 meters per second, the spheres being equal-falling in water, the galena having a diameter of 4^{mm} , and the quartz $16\frac{1}{4}^{\text{mm}}$. From (1) we find:

For $t = 1$,	$v = -2.606^{\text{m}}$. for galena;	$v = -4.263^{\text{m}}$. for quartz.
For $t = 2$,	$v = -3.901^{\text{m}}$. for galena;	$v = -6.761^{\text{m}}$. for quartz.
For $t = 4$,	$v = -4.801^{\text{m}}$. for galena;	$v = -8.899^{\text{m}}$. for quartz.

The limit of the velocity of the galena is -5.045 , and for the quartz -9.714 .

To sum up the results thus far, we see that the velocity of an ascending current of air to keep a $\frac{1}{2}$ -inch quartz ball in suspension is 86.2 feet per second, and that in this current a $\frac{1}{2}$ -inch galena ball will rise with an increasing velocity, which never exceeds 13 feet per second. We also find that the galena would fall 8 feet in still water in 3.38 seconds, and that, practically, the quartz ball would fall in the same time, being only 0.05 of a second behind. We see that, practically, the quartz and galena are equal-falling, that they remain together in a column of water, whether at rest or in motion. From XI, we see that the two balls of quartz and galena, which are theoretically equal-falling in water, may be separated by a stream of air, the falling velocity of the quartz being nearly twice as great as that of the galena. We also see that the velocity of an ascending current of air which will keep a $\frac{1}{2}$ -inch galena ball in suspension is about 13 feet less per second than is required to keep a $\frac{1}{2}$ -inch quartz ball in suspension; that in this current the quartz ball would fall with a rapidly-increasing velocity, and that, practically, this velocity becomes constant after a few seconds, and is then about 13 feet per second, being the same velocity that the rising galena ball would attain in a stream of air which would sustain the quartz. We also see how very little the diameter of the galena would have to vary in order to have entirely different action in the current which sustains the quartz. If the diameter is $\frac{1}{2}$ inch, it rises; if the diameter is 1.39 eighths, it remains in suspension; and if the diameter is 1.52 eighths, it will fall as

in still water. This illustrates how delicate a medium for separation air is compared with water. If the three galena balls were placed with the $\frac{1}{2}$ -inch quartz ball in an ascending stream of water which would hold the quartz in suspension, they would separate very slowly, the heaviest galena ball having a maximum falling velocity of about 8 inches per second. But this sensitiveness of a stream of air is not necessarily an advantage, for it requires a correspondingly exact uniformity in the blast of air and the material to be worked, which is not attainable in practice. From IX and X we see that the blast of air necessary to cause the $\frac{1}{2}$ galena ball to be retarded to the same extent that it would be in water at rest, or, more exactly, to fall 8 feet in the same time as in water at rest, is 69.62 feet per second, and that in this stream the $\frac{1}{2}$ -inch quartz would fall 8 feet in about 1 second. It did not fall in the experiment as performed, because the condition under which the experiment was tacitly supposed to have been performed, the condition upon which every discussion on the laws of bodies falling in fluids is based, was violated. This condition was that the air should be perfectly free to move, that the tension of the air below the ball should be the same as above it. In the case of the galena ball this condition was practically complied with, the section of the ball being only $\frac{1}{256}$ that of the tube, but in the case of the quartz ball its section was $\frac{1}{16}$ of the section of the tube. The quartz, when held in suspension, had the same effect in offering resistance to the passage of the air that it would have had if firmly fixed in the middle of the tube. It was held up against the force of gravity not only by the buoyancy of the air and by the force due to the velocity of the air, but also by the excess of tension below it. It was sustained in part by the same kind of force that impels a package through a pneumatic tube, or forces the cork out of a pop-gun. If the diameter of the tube had been 1 inch instead of 2, the velocity of the air necessary to sustain the quartz would have been much less than 69.62 feet, the section of the tube being only four times that of the sphere. That all the difference between the theoretical results and the result of the experiment as performed was due to this one cause cannot be asserted. There may have been some inaccuracy in measuring the small galena ball, and we have seen what a change in action a difference in diameter of $\frac{1}{8}$ inch makes. The balls may have been rough or not of spherical shape; indeed, from the brittle, crumbling nature of galena it must be quite impossible to make a small smooth sphere out of it.

But supposing that the theoretical results may all be verified by properly conducted experiments, the point which Mr. Krom made, namely, that, though the two balls could not be separated by water, they could be separated by air, remains the same, and it makes very little difference whether the galena goes up or down, if it only leaves the suspended quartz ball. After describing the experiment, he says: "Thus demonstrating that, instead of less margin, we have in air much greater margin for separating ores than in water. Before making these experiments I expected to find a margin for separating ores in favor of air, but did not anticipate it would prove so great. But the experiment proved that $\frac{1}{2}$ globule of galena and $\frac{1}{8}$ of quartz, which are equal-falling in still or moving water, can be separated by air. The results correspond exactly with the results obtained in practice, viz, that with less sizing better results can be obtained with air than can possibly be reached with water." The expression "greater margin" might be misleading. It is often applied, in speaking of difference in cost and selling price, to profits, where

a large margin is desirable; it is a pleasing term, but the only meaning it can have in the case under consideration is, that the ratio between the sizes of quartz and galena which air will separate and water will not is greater than the ratio between the two sizes that water will separate and air will not. This is true, and if all the pieces of ore in a crushed heap were of two sizes only, and the quartz pieces were four times as large as the galena, air would be a better medium than water. But this is not the case in practice, and if it were, a screen would be the simplest separator. If the pieces of quartz were 2.88 eighths and the galena $\frac{1}{8}$ inch in diameter, air would not separate them, but water would; hence water, though offering less "margin," is in this case a better separator than air. That medium is the best for the separation of two substances for which the ratio of the diameters of equal-falling spheres is greatest, or, in other words, that medium is best which will separate most readily spheres of the two substances nearest in size. Hence, a fluid whose specific gravity lies between those of the substances is the best, and of two fluids, both lighter than the substances, that is better which is denser. As regards sizing, the lighter fluid requires a more careful sizing, the number of sizes required for the different fluids being inversely proportional to the ratios of equal-falling diameters. With any fluid the excellence of separation increases with the number of sizes, and the Germans have found by experience that it is advantageous to make ten sizes between 18^{mm} and 1^{mm}. The excellence of their work in concentration is remarkable, nearly all the loss being in the loss of the minute particles of ore which are carried away with the slimes of the gangue. Their system seems perfect in other respects, and now the problem is, to devise some way of saving those fine particles, which remain for a long time in suspension even in water at rest. In dry concentration the loss in this form is avoided; the ore-dust is removed with the gangue-dust, and both are saved—"saved for subsequent treatment" is the last operation it goes through generally. Now, it is proposed, however, by the manager of one system of *dry* concentration, to treat this dust in the *wet* way, thus employing water only in that part of the operation where it is most wasteful. If there is any place in which air can be economically used, it is in the treatment of the finest sizes, from 4^{mm} to $\frac{1}{2}$ ^{mm}, or as fine as can be well sized. From the great velocity of air necessary to raise or hold in suspension a quartz ball of from 12^{mm} to 16^{mm} diameter, it would seem quite impossible to treat such sizes economically by means of air.

To give an opportunity of testing the theoretical results as described by means of the preceding formulas, the following table has been calculated. Since perfect spheres of quartz and galena are difficult to make, four other substances have been taken—ivory, glass, zinc, and lead, from which, by turning or molding, very perfect and smooth spheres may be made. The first vertical column contains the name of the substances, the second their specific gravities, the third their diameters in millimeters, the fourth their weight in grams, introduced as a check. If the balls do not weigh as here given, either they have not been made of the right size or the specific gravity is different from that assumed here. As the specific gravity of these substances is quite uniform and well established, any great variation in weight would probably be due to error in size or shape. The fifth and sixth columns contain the suspension velocities for water and air respectively, in meters; by suspension velocity being understood the velocity of a vertically-ascending stream of the fluid necessary to keep the given sphere in suspension. The seventh, eighth, and ninth columns contain the times, in seconds, of fall-

ing from rest in water at rest through 3, 5, and 10 meters, respectively. These values were calculated from (9). Since s is negative for all cases, we may as well regard downward direction positive and write the formula

$$(13) \quad t = sA + \frac{0.69315}{B}.$$

Substance.	Density.	Diameter in millimeters.	Weight in grams.	Suspension velocity in meters.		Value of t for water when $C = 0$ and $s =$		
				Water.	Air.	3m.	5m.	10m.
Ivory	1.87	2	0.0078	0.213	8.84	14.10	23.48	46.92
Glass	2.65	2	0.0111	0.294	10.53	10.25	17.06	34.08
Zinc	6.90	2	0.0259	0.535	16.99	5.45	9.05	18.05
Lead	11.35	2	0.0475	0.736	21.79	4.14	6.85	13.65
Ivory	1.87	4	0.0627	0.302	12.50	9.99	16.62	33.80
Glass	2.65	4	0.0858	0.415	14.89	7.27	12.08	24.19
Zinc	6.90	4	0.2312	0.786	24.02	3.88	6.43	12.63
Lead	11.35	4	0.3803	1.040	30.81	2.97	4.89	9.69
Ivory	1.87	8	0.5013	0.427	17.68	7.10	11.79	23.51
Glass	2.65	8	0.7104	0.587	21.03	5.17	8.58	17.09
Zinc	6.90	8	1.850	1.111	33.97	2.60	4.60	9.10
Lead	11.35	8	3.043	1.471	43.58	2.15	3.51	6.91
Ivory	1.87	12	1.692	0.522	21.46	5.82	9.65	19.22
Glass	2.65	12	2.398	0.730	25.78	4.25	7.03	13.98
Zinc	6.90	12	6.243	1.361	41.61	2.32	3.79	7.46
Lead	11.35	12	10.27	1.602	53.37	1.81	2.92	5.69
Ivory	1.87	16	4.011	0.403	25.00	5.07	8.38	16.67
Glass	2.65	16	5.683	0.631	29.77	3.71	6.11	12.13
Zinc	6.90	16	14.80	1.571	48.05	2.04	3.31	6.50
Lead	11.35	16	24.34	2.081	61.56	1.60	2.56	4.97

For all the cases assumed in the preceding table formula (13) is more than sufficiently accurate, but it would lead to wrong results if applied to bodies falling in air. In the exact formula (9) the value of $-2sAB$ varies, in the case of air, from 2.5 for ivory 2^{mm} in diameter falling 10 meters to 0.0155 for lead 16^{mm} falling 3 meters; hence, -1 cannot be neglected in comparison with ε^{-2sAB} . But for water $-2sAB$ varies in the same limits from 2006.5 to 12.4; hence, -1 may be neglected, and (9), deduced on this supposition, may be employed. As far as experimental verification is concerned, the formula $t = sA$ is sufficiently accurate for water, the value of the remaining term of (13) varying in the assumed cases between 0.032 for ivory 2^{mm} and 0.161 for lead 16^{mm}. When C is not equal to 0, we may employ (10) to find the falling time, provided $AC - 1$ may be neglected in comparison with $(AC + 1) \varepsilon^{2Bs}$; that is, when $AC - 1$ is nearly equal to 0, or $C = \frac{1}{A}$ nearly; that is, when the velocity of the current is somewhere near the suspension velocity. $AC - 1$ may also be neglected, though not very small, if $(AC + 1) \varepsilon^{2Bs}$ is large, or if B is large; or, as B is inversely proportioned to the square root of d , when the sphere is very small. Relatively to the density of the sphere, B is a maximum, in the case of water, when the density is 2. If the density of the sphere is less than that of the fluid, A and B are imaginary. The fundamental formulas (1) and (2) were deduced on the supposition that the density of the sphere was greater than that of the fluid, and they would assume an entirely different form, and the discussion would be quite different under the supposition that the density of the sphere is less than that of the fluid.

From the table we see that a blast of air which will keep in suspension a 2^{mm} lead ball will sustain a glass ball 8^{mm} in diameter, or an ivory ball 12^{mm} in diameter. The suspension velocity for the lead being 21.79^m, and for the other two 21.05^m and 21.46^m, the ivory and glass would rise, theoretically, with a slight velocity; but as perfect accuracy cannot be attained in the conditions, the results of well-conducted experiments might vary somewhat from the theoretical. From the table we also find that an ascending current of water which will support a 2^{mm} ball of lead will sustain a 12^{mm} glass ball, the glass rising slowly, perhaps. Similar experiments may be made in water with ivory 16^{mm} and glass 8^{mm}, with ivory 12^{mm} and zinc 2^{mm}, with lead 4^{mm} and zinc 8^{mm}. In water at rest, ivory 16^{mm} and glass 8^{mm} will fall 3 meters in about 5.1 seconds; glass 16^{mm} and zinc 4^{mm} will fall 10 meters in nearly the same time, between 12 and 13 seconds, the glass reaching the bottom about $\frac{3}{4}$ second sooner. Similarly a large number of experiments may be made up from the table to test the theoretical results. Experiments with very small and light balls, such as 2^{mm} ivory or glass, would probably not coincide very closely with theory, on account of unavoidable inaccuracy of measurement or the adhesion of air-bubbles.

The following may also serve for experimental tests:

XII. In an ascending current of air which will keep an 8^{mm} ivory ball in suspension, how long will it take a 4^{mm} zinc ball to fall 3^m? From (10) we find $t = 1.787$.

XIII. In a stream of air which will keep a 12^{mm} glass ball in suspension, how long will it take a 4^{mm} lead ball to fall from rest 3^m and 5^m? From (10) we find for 3^m $t = 2.235$, and for 5^m $t = 2.633$. From these two answers we see how nearly the lead ball has attained the limit of its velocity. The limit is $30.813 - 25.783$, or 5.03. It passes over the last two meters in $2.633 - 2.235$ seconds, or in 0.398 of a second, which is at the rate of 5.003 meters per second. Therefore, we may assume the velocity constant, and say, for instance, that it would fall through 10 meters in $2.63 + 1 = 3.63$ seconds.

XIV. In a stream of air which will support a 12^{mm} ivory ball, how long will it take a 12^{mm} glass ball to fall from rest through 3^m, 5^m, and 10^m? From the same formula (10) we find $t = 2.064$, 2.524, and 3.674.

XV. How long will it take a 16^{mm} ivory ball to fall from rest in air at rest through 30^m, 40^m, and 50^m? From (8), $t = 2.671$, 3.162, 3.623. In a vacuum these values would be 2.473, 2.856, and 3.193.

XVI. How long will it take a 4^{mm} ivory ball to fall from rest in air at rest through 30^m, 40^m, and 50^m? From (8), $t = 3.280$, 4.4081, 4.882. In a vacuum these values would be 2.473, 2.856, and 3.193.

CHAPTER XVII.

NOTES ON THE BRÜCKNER CYLINDER.

By N. H. CONE, *Nederland, Colorado.*

In addition to the report of the workings of the Nederland Mill, furnished by Mr. Cone, (see page 308 of this volume,) I take pleasure in publishing the following very practical hints on the proper handling of this apparatus from the same source. Mr. Cone's success in the technical management of the mill referred to renders his suggestions and opinions important to other metallurgists. Since its preparation this article has been communicated as a paper to the American Institute of Mining Engineers.

It is somewhat surprising that among the many mechanical devices that were brought into the State of Colorado the Brückner cylinders alone have stood the test for roasting ores. The brick walls of the Arey and Stetefeldt furnaces have been remodeled into reverberatories and compound reverberatories, their binding and anchor irons have been forged into hoes and shovels, while the Crosby and Thompson cylinders have been rent by the ruthless hand of the foundryman searching for a tough piece of boiler-plate. Two only of these furnaces remain in operation of the large stock that came into Colorado by car-loads several years ago, and they occupy only a subordinate position to some reverberatories on the North Boulder Creek.

But to-day there are in Colorado, in active operation, ten Brückner cylinders, and two or three more running part of the time. During the past year they have handled nearly one-half of the number of tons of silver-ore that has been mined.

Four of the cylinders I have been using in the Nederland Mill, in which I have roasted nearly four thousand tons of silver-ore during the past year, with results more favorable than have hitherto been attained.

The Nederland Mill is similar to many others in Colorado and Nevada. The plant consists of a Blake crusher, three batteries of five stamps each, four Brückner cylinders, and fourteen amalgamating-pans, with settlers, agitators, &c. The ore, after being dried on the drying-kiln, which is heated by the waste gases of the furnaces and an auxiliary fire, is weighed and fed into the batteries, which are dry-crushing, (size of screens 40 meshes to linear inch,) and thence carried by conveyors and an elevator to sheet-iron hoppers over the cylinders. The size of the cylinders is twelve feet long by five feet six inches in diameter. Mr. J. M. Locke has given an excellent description of them in a paper read before the institute, (vol. ii, Transactions,) and as during the coming year some very material changes will be made in their construction by reducing the weight, thereby reducing the cost of freight, and in the driving-gear, I will not go over the same ground.

After several trials I found that 3,700 pounds was the limit that could be handled for a charge in the cylinders of ores from Caribou Hill, and with several small lots of custom-ore I reduced it to 3,500 pounds. From these trials I very soon saw that to handle the cylinders not only to their utmost capacity, but to do thorough work, it was necessary to charge an amount of ore that, when it reached its largest volume in smelting, it would barely run out of the back nozzle of the cylinder. I have sometimes been delayed by small charges that it seemed almost impossible to finish.

The addition of salt I varied according to the value and quality of the ore; usually it was 175 pounds to the charge, occasionally 200 pounds. The time of roasting ranged all the way from 8 hours to 12 hours. I gave my men strict orders never to draw a charge till it was thoroughly *done*, if it took a week; fortunately this circumstance never happened.

When I first took charge of the mill, the diaphragms to the cylinders were entirely eaten away. For some reason "*basic scale*" would not form on those pipes and plates, nor on the new diaphragms that I put in last September. The stumps of the pipes that remained gave me a great deal of trouble by working loose in their sockets, and allowing the half-roasted ore to leak out, so that I finally removed every vestige of

the diaphragms, and run the cylinders for over six months with nothing but a lining of common red brick. Having never enjoyed the benefits of a new set of diaphragms, I was very anxious to try them; so in last September I put in a complete set all around, and relined the cylinders, and during the next 60 days saw them rapidly disappear, and I was obliged to clean out the dust-chambers twice as often, and take out three times as much as ever before, and since November, 1875, I have been running on the good old plan.

The class of ore that I have been treating contains about 11 per cent. of mineral matter on the average for the year.

Galena.....	5 per cent.	} = 11 per cent.
Blende.....	4 per cent.	
Copper-pyrites	2 per cent.	

I have occasionally had custom-ore that would reach up to 30 or 40 per cent. of mineral matter, and have been very successful in roasting it, the only difference being that it required a little longer time.

Part of the year I have had 8-hour shifts on, and the rest of the time 12-hour shifts. The advantage of 8-hour shifts is that the men watch the charges closer, and in case one is sick, or it becomes necessary to discharge one, the two can be put on 12 hours, and the work will go along surer than if a new man from some other part of the mill was put on.

I have adopted the following plan for taking samples, after trying different methods. The roaster opens the first door that approaches him, and, as it passes around and commences to dump the ore into the car the second time, a sample is taken with a long-handled shovel, allowed to cool, and then wrapped up in paper and the number of the charge marked on it. A regular list is kept of all charges, giving date, quantity, time charged, time discharged, quantity of salt used, workman's name that charged and discharged the ore, with remarks whether Caribou or custom ore had been used. Assays for chlorinations are made of each man's work, and the average recorded on the office book.

I changed the diameter of the nozzles several times. The flue to the dry-kiln leads off from the dust-chambers near No. 4 cylinder, so that the gases from No. 1 cylinder have the greatest distance to travel.

No. 1 cylinder, fire-box nozzle, 16 inches; back nozzle, 17 inches.

No. 2 cylinder, fire-box nozzle, 16 inches; back nozzle, 12 inches.

No. 3 cylinder, fire-box nozzle, 16 inches; back nozzle, 18 inches.

No. 4 cylinder, fire-box nozzle, 15 inches; back nozzle, 17 inches.

I have arranged the year's work under the following table, so that the work of different months can be easily compared. I also give the maximum and minimum of chlorinations and fineness of bullion, as well as the monthly averages.

Month.	Maximum, minimum and average.	Per cent.	Weight in tons.	Assay.	Fineness of bullion.	Time of roasting.	Barrels of salt used.
January..	Maximum of chlorination....	92.5	9.031	147	828	8½	137
	Minimum of chlorination....	77.8	5.093	30	713		
	Averages	90.	396.8	52	744		
February.	Maximum of chlorination....	95.4	11.231	152	831	8½	103
	Minimum of chlorination....	89.7	10.344	50	788		
	Averages	91.0	318.2	70	812		
March....	Maximum of chlorination....	91.2	12.595	74	821	9	137
	Minimum of chlorination....	87.1	11.102	37	740		
	Averages	88.	371.2	46	790		
April.....	Maximum of chlorination....	93.2	8.505	92	847	9	136
	Minimum of chlorination....	89.8	12.027	34	766		
	Averages	91.0	353.4	58	807		
May	Maximum of chlorination....	94.5	10.214	163	842	9½	140
	Minimum of chlorination....	86.8	7.361	26	763		
	Averages	89.4	329.8	54	825		
June	Maximum of chlorination....	90.8	5.980	42	815	10½	133
	Minimum of chlorination....	85.9	10.580	32	773		
	Averages	88.3	393.9	37	794		
July	Maximum of chlorination....	88.8	362.7	42	820	9½	136
	Minimum of chlorination....	92.	10.	41	866		
	Averages	87.6	12.148	27	826		
August...	Maximum of chlorination....	92.	10.	41	866	10½	100
	Minimum of chlorination....	87.6	12.148	27	826		
	Averages	89.1	319.9	36	854		

Month.	Maximum, minimum and average.	Per cent.	Weight in tons.	Assay.	Fineness of bullion.	Time of roasting.	Barrels of salt used.
September	Maximum of chlorination....	91.4	12.540	56	928	11	98
	Minimum of chlorination....	85.5	14.605	26	858		
	Averages.....	89.1	246.2	51	893		
October ..	Maximum of chlorination....	92.	11.880	65	946	10½	96
	Minimum of chlorination....	87.5	8.580	56	868		
	Averages.....	89.1	300.8	43	902		
November	Maximum of chlorination....	95.9	12.600	31	875	11	106
	Minimum of chlorination....	89.	6.930	21	814		
	Averages.....	92.8	305.3	41	853		
December	Maximum of chlorination....	92.4	14.300	48	822	10	42
	Minimum of chlorination....	89.3	14.520	56	777		
	Averages.....	91.5	120.9	53	804		

The consumption of wood is about a cord and one-half to five tons of ore; this, of course, depends on how constantly the cylinders are kept running.

The expenses for treating ore has been, per ton—

Labor	\$6 18	Oil, candles, &c	\$0 37
Quicksilver.....	0 76	Repairs	1 68
Salt	2 09		
Wood	3 43	Per ton.....	14 51

By wetting the ash-pit I have been enabled sometimes to get a current of steam to pass into the cylinders, and have found it a very good way to regulate the fires.

I have had no difficulty in teaching men how to roast; they very soon take hold of it, and there seems to be a general desire among the workmen to learn.

CHAPTER XVIII.

DRY ORE-CONCENTRATION AT THE MANHATTAN SILVER-MILL, NEVADA.

By A. TRIPPEL, *Mining Engineer, New York.*

The following figures, showing the working results of the Manhattan Mill at Austin, Nev., in 1875, were taken from the books of the Manhattan Silver-Mining Company, by kind permission of its agent, Allen A. Curtis, esq. The peculiar character and great richness of the Reese River district ores worked in this mill are well known and need no new description. It may be well to call attention to the fact that the fuel used for the Stetefeldt furnace in this mill is wood and charcoal combined. Of the whole wood and charcoal consumed, about nine cords of wood are used daily for the motive-power, and a small quantity of charcoal for the melting-furnace and assay-room; the remainder is used for the roasting of ores. It should also be mentioned that the cord of wood costs \$12, and charcoal 30 cents the bushel, while labor is generally paid \$4 per shift.

1875.	Pounds ore reduced.	Assay-value.	Bullion obtained.	Value tailings.	Bullion and tailings.	Amount lost.	Average mill-test.
January	1,126,000	\$100,364 29	\$27,076 37	\$10,359 20	\$97,395 57	\$2,968 72	\$172 23
February	1,233,500	78,296 62	70,120 38	7,795 74	77,916 16	380 46	177 93
March	1,236,250	127,602 00	111,087 37	12,387 23	123,474 60	4,127 40	203 20
April	117,500	116,669 94	106,654 69	9,067 93	115,722 62	947 32	209 94
May	966,000	105,277 64	94,613 13	10,413 48	105,026 61	251 03	209 21
June	1,167,000	137,087 70	114,997 89	12,965 37	127,963 26	9,124 44	230 04
July	1,136,500	130,935 71	111,874 53	11,088 90	123,563 43	7,372 28	227 04
August	939,500	94,384 64	81,935 72	9,105 75	91,041 47	3,343 17	196 12
September	1,120,750	110,256 54	96,907 49	10,495 82	107,403 31	2,853 23	198 07
October	1,255,750	139,871 26	120,435 49	10,888 49	131,303 98	8,567 28	251 35
November	1,094,500	110,401 10	96,178 62	9,303 25	105,481 87	4,919 23	202 01
December	1,176,500	122,818 20	112,812 50	8,970 81	121,783 31	1,034 89	205 74
Totals and averages	12,240,750	.....	1,204,654 18	.....	.....	.....	.....

1875.	Per cent of bullion.	Per cent of tailings.	Per cent of loss.	Per cent of chlorination.	Wood consumed. Cords.	Charcoal consumed. Bushels.	Pay-charges. Pounds.	Pounds crushed per hour.	Cost of milling.
January	86.72	10.6	2.67	89.8	628	4,800	2,000	1,592	Labor
February	89.55	10.2	0.27	90.	363	3,500	1,787	1,731	Fuel
March	87.03	10.3	2.64	90.6	528	4,727	1,719	1,816	Supplies
April	91.41	7.7	0.884	90.2	443	4,025	1,650	1,839	Quicksilver
May	89.87	10.2	.....	91.6	436	3,840	1,785	1,898	Salt
June	83.88	9.4	6.71	92.2	453	4,700	1,690	1,885	Office labor
July	85.44	8.9	5.65	92.3	587	4,964	1,716	1,800	Castings
August	86.81	9.7	3.48	91.8	461	4,931	1,566	1,719	Hauling
September	87.69	9.7	2.40	91.5	463	5,400	1,729	1,916	
October	87.03	8.4	4.58	93.8	458	6,300	1,794	2,137	
November	87.11	8.8	4.08	92.6	413	5,230	1,852	2,130	
December	91.85	7.7	0.44	94	451	5,100	1,761	1,890	
Totals and averages	87.67	.....	.....	91.8	.....	.....	.....	.....	31 72

At the present time the expenses of milling the ore must be less, as the company now has its own iron-foundry on the spot, and an extensive, well-appointed repair-shop. With regard to the percentage of silver produced, there is no doubt that the Manhattan is far ahead of any other mill in Nevada, and its working results may, therefore, be the more interesting.

The most important feature in Reese River district was the introduction of "Krom's" dry separation or concentration of ore at the Manhattan Mills. It has already been stated in last year's report that previous tests with Lander Hill ores in Krom's establishment at the Sheba Mine, near Unionville, had given satisfactory results, and it was expected that equal results would be obtained at Austin with the same ore. These results (of which I give the details in the appended table) were a total product of concentrations, including dust, equaling about 83 per cent. of the assay-value of the worked ore. The ore which was used on that occasion was a mixture from the three principal mines then worked by the Manhattan Company, having a mean assay-value of \$120 per ton. Of this mixture a little over five tons were treated. The mineral in the ore consisted of sulphurets of iron, copper, lead, fahlore, antimonial silver and ruby silver, finely distributed through the quartz, yet most of the particles were easily visible, and could be well distinguished from each other. The results being as favorable as could be expected, it was decided to construct works with a capacity to treat 50 tons of ore per day, and during the winter the machinery, or most of it, was constructed in New York, and erected the following summer in the building formerly known as the "Boston Mill," and expressly purchased for that purpose by the Manhattan Company. The main part of this building is a massive structure 116 by 44 feet, with a large extension on the east side, and spacious rooms for steam engine and boilers. The motive-power was furnished by two engines, one of 80 horse-power for the crushing, and another of 15 horse-power for the concentrators proper. The first was partly rebuilt by Booth & Co., of San Francisco, from the engine on hand in the mill-building, and was provided with the best modern improvements; the smaller one was an ordinary engine. The arrangements for feeding the boilers were exceedingly well made, and everything done to economize fuel, which at Austin is very expensive. The machinery for crushing and concentrating was distributed mainly on two floors of the main building, with a loft and screen-tower, with bins for ore and tailings, and the main portion of the screening and sizing arrangements. The building being on a hillside, it was arranged that the ore be dumped high up on a platform in the rear of the same, and delivered through chutes on the second floor next to the ore-breaker—one of Blake's largest size.

From the ore-breaker the ore went through a chute to the first set of steel rolls below, and subsequently through another chute into an elevator, raising it again to the second floor to a rotary screen, which separated all above a certain size from all that was finer, delivering the latter to a second and general elevator, while the coarser part went to the second pair of steel rolls on the second floor. This rotary screen had at one of its ends a very coarse, three-quarter inch sieve, for the purpose of throwing out any larger bodies, among which were generally bits of steel from mining-tools. The ore which passed the second rolls descended to another rotary screen, and finally to the third rolls, from which all was elevated some seventy feet to the top of the screen-tower. The screens in the tower were four; one having 16 meshes, the next 25, the third 50, and the fourth 100 meshes to the linear inch. All too

coarse to pass the first went back down to the third crusher; the balance was screened into three sizes on its way down, and each size was received in a separate ore-bin on the third floor or loft. Connected with the crushing, screening, or sizing apparatus were branches of large pipes, leading to an exhauster, which carried the dust into a large dust-chamber, situated immediately under the roof. The concentrators proper received their charge continuously from the different bins through wooden tubes. The concentrations from eight machines of three sizes fell into hoppers, and from these into three concentrators on the lower floor, where they were reconcentrated, while the tailings fell on endless-belt carriers, and from there to elevators and bins arranged to receive each sort of tailings, from day or night work, separate. From these bins they were carried off outside. The sampling of the tailings and the different sizes of ore and the dust (which comprised all ore finer than passed a hundred-mesh screen) were done in the most careful manner, so that the assays represent the actual results of every day's and night's work. I should mention that the *dust* had to be taken as it was, as any further concentration of such fine stuff was entirely impracticable.

The whole machinery was unquestionably of fine make, and on the whole well arranged. In my opinion, the high tower for screening it was objectionable, being, if not inaccessible, at least laborious to reach in its upper parts, and especially because the whole screening-machinery was out of sight, and not fully under control in case of accidents.

Neither were the arrangements to prevent the dust as complete as could be. In the successive crushing by a breaker and three steel rollers, care should be taken that right from the beginning no stuff should pass the *next* crusher which is fine enough for the *second* ahead. This idea, well carried out, not only prevents much dust, when the chutes and screens are well boxed, but the forming of impalpable powder, or at least very fine ore, which cannot be concentrated any further. The regulation of the large Sturtevant exhauster is not an easy task at all; either its force is not sufficient to suck up all the dust when the place becomes intolerably dusty, or it is too much and the dust is carried far off through the opening at the farthest end of the chamber. The steel rollers of Mr. Krom are exceedingly well constructed, and many parts are of cast steel; the diameter of the rolls was 26 inches, with a tire $2\frac{1}{2}$ inches, made of cast steel. They are undoubtedly the finest crushers ever made, well proportioned, and very powerful. I think, however, that their diameter should diminish as the stuff becomes finer, so that, for instance, the present diameter be maintained for the first pair, about 22 inches for the second, and but 18 inches for the third pair. I am fully convinced that such a diminution in size would be most beneficial where the ore has to be crushed fine. The face of the rolls was 15 inches, and the tire composed of two pieces, joined in the center, it having been found difficult to make cast-steel tires of the right temper as much as 15 inches wide. There was a marked difference in the behavior of the different steel tires; some, thought to be too soft at the beginning, stood the best, and worked off the most uniformly; others, which seemed to withstand the hard quartz well at the start, showed themselves to be brittle, and the edges broke off on some of them. It is not a too hard metal which is wanted; a medium temper and great toughness seem to be most desirable. The wear and tear of the three pairs of rollers, after the crushing of over 1,200 tons of quartz, averaged about $\frac{3}{16}$ of an inch on the surface; they were turned down, but it was found necessary to use titanium steel tools to do this successfully. The gear being so arranged as to suit a continuous decrease of diameter, it is not doubted that these

rolls would crush over 8,000 tons before the tire should be renewed, and, where the gangue is not too hard, much more.

The arrangements to prevent fractures consisted essentially in the use of powerful steel springs, behind which were breaking-cups, which not unfrequently proved their usefulness, and likewise the danger of being in too near proximity to them. The third pair of rolls, for fine crushing, should, in my opinion, have no elasticity, but be screwed tight, or nearly so, provided the feeding is well regulated, and care be taken that no larger bodies than those intended come between the rolls. Most frequently stoppages occur by over-feeding, not so much by the coarse stuff as by the fine. The velocity which Mr. Krom gives to his rolls is rather excessive, and would puzzle such authorities as Rittinger. While I believe in a high velocity for small rolls and fine crushing, I hold a more moderate speed for coarse work preferable. A speed uniformly at 50 revolutions seems rather too high.

The speed for the rotary screens was variously tried and deserves all attention; while a too sluggish movement permits too great accumulation of ore, and in consequence an imperfect screening, too high speed throws the stuff violently from one face to another without giving it time to pass the meshes. It was found that about sixteen to eighteen revolutions was the most satisfactory rate.

The material subjected to Krom's dry concentration was not the same as that used on the preliminary trial. It was merely waste ore from a few mines—ore in which the mineral was so exceedingly finely disseminated that it appeared rather as a light-grayish streak, developing under the microscope an aggregate of minute particles of sulphurets. There was a steady value in that part of the ore, an assay-value which might have averaged perhaps \$9 per ton, and it was nearly the same whether the *whole* assay-value of the ore was \$15 or \$40, the increase in the value of the ore being caused by more coarse (though still fine) particles of mineral. This fine part of mineral was as much as lost; although our coarsest size was already finer crushed than most ore for concentration is intended to be crushed, the particles showed plainly under the magnifier these grayish colors undetached from the more white quartz, and not sufficiently different in specific gravity to permit any successful separation. This fact will, I think, sufficiently explain why the tailings of the *lowest* grade were not much different from those of the higher grade ore, understanding that the two figures given above represent the two extremes in this case.

Other obstacles in the way of success were the absence of any drying apparatus, without which, as is well known, neither a stamp-mill nor a crusher, much less various sets of fine screens, can work satisfactorily. Some of the waste ore was delivered not many hours after it was hoisted from the mines, and in some instances thoroughly wet. In addition to that, no care was taken to separate the country-rock—in this case more or less decomposed granite—from the quartzose ore, which not only increased the dust considerably, but caused more difficulties in the screening.

From these facts it will be seen that this test of dry concentration was, to say the least, an uncommonly severe one, and would have been the same for any method of concentration.

Mr. Krom's concentrators proper are decidedly well constructed, and admit of the finest variations of movement in point of speed and strength, according to the different character of the ore; still there are some details which, in my opinion, could be materially improved. The greatest difficulty, however, seems to me to be the screening and the

separation of all dust or dust-like ore before it passes into the concentrators and there causes an imperfect working. Even if that dust is separated, its disposition, in the absence of reduction-works on the spot, will be embarrassing and cause more or less loss. In this case, the dust, including all that passed a screen with 100 meshes to the linear inch, amounted to about 17 per cent. of the worked ore, and its average assay-value was about 48 to 50 per cent. above that of the value of the ore. It should be said that samples of dust, taken at a distance from the surroundings of the buildings, assayed the same as those taken from the nearest spot in the dust-chamber, proving how eminently *fine* the mineral particles were. All that class of product was sacked and milled without any other preparation than roasting in the Stetefeldt furnace.

A most interesting comparative test with wet concentration was made side by side with the dry process. A well-constructed automatic-working triple jig was used; the water, being scarce, was continually pumped back in the reservoir, and, as the ore was comparatively free from dust, no difficulty was experienced in doing so. The general result was that the product was equal to that made in three of Krom's separators; the average tailings were a trifle poorer, but the concentrations were by far lower in value than in Krom's machines, and my impression is that the work done by the latter is preferable for that class of ore.

The average assay-values for wet and dry tailings, under precisely the same circumstances and the same ore, were as follows during six days' regular work:

Average dry tailings.	Average wet tailings.	Average dry tailings.	Average wet tailings.
\$12 55	\$11 76	\$10 20	\$8 61
11 76	11 76	15 71	9 16
11 78	10 59		
10 98	9 43	Mean, 12 16	Mean, 10 22

A synopsis of the general results of three months' working will show as follows:

In 61 working days were crushed and concentrated	1, 210 tons.
Average crushed in 10 hours	20 tons.
Consumption of pine wood per day	2½ cords.
The average assay-value of the ore	\$29.16
Average assay-value of dust-like ore	\$46.00
Of this dust was produced about	17 per cent.
Of real concentrations	4.9 per cent.
Assay-value of concentrations varied between \$108 and \$560, and averaged approximately	\$250.00.

A comparison between concentrations made by dry and by wet process will show the following values:

Dry concentrations.		Wet concentrations.	
Coarse	\$141 35	Coarse ore, 1st box	\$53 4
Medium	442 96	2d box	157 0
Fine	251 33	3d box	34 54
		Coarse ore, 1st box	72 2
		2d box	196 3
		3d box	62 8

The value of the combined product, consisting of the concentrations proper and the dust-like ore, which was delivered as product, amounted to about 56 per cent. of the assay-value of the ore received; the loss

therefore, was considerably larger than that sustained at a previous trial made with a better class of ore. I have already called attention to the fact that there was no proportionate difference in the value of tailings, whether the ore was worth \$17 or \$40, as the following figures will show, these figures being computed from the daily working during 61 days:

Ore averaging from—	Tailings were—	Ore averaging from—	Tailings were—
\$15 to \$18 85	\$10 98	\$28 to \$30	\$13 49
20 to 22 00	12 95	30 to 33	12 93
23 to 24 00	12 38	33 to 36	14 44
25 to 26 00	11 79	36 to 39	14 26
26 to 28 00	12 86	39 to 50	14 49

The entire cost of crushing and concentration per ton of ore, including hauling from the mines, varied between \$4.50 and \$5. It should be said that this estimate includes the first month of working, during which many delays occurred and numberless difficulties had to be overcome. The financial result for the Manhattan Company, although not entirely satisfactory to them, was, nevertheless, very fair, inasmuch as even that class of ore which could not have been worked without considerable loss in the usual way paid its own way, was made productive, and left a small profit. I am satisfied that the concentration of better ore, or what is called second class in Austin, would prove of great advantage, while admitting that the so-called dump-ore, which was exclusively worked, will never give the results expected by the parties erecting the works, nor will any other method give better results. An important fact which was developed on this trial is the apparent practicability and advantage in substituting a systematic crushing by steel rolls for stamp-batteries. If only the crushing had been the object in this case, it would not have cost over \$2 per ton to make pulp fine enough to pass a 100-mesh screen. With every possible effort to avoid making such fine ore, we nevertheless produced 17 per cent. of it, much to our dislike, and crushed, say, 20 tons of ore in 10 hours, with but two cords of wood at the highest calculation, the rest being consumed by the concentrators and screens. When it is considered that the ore was delivered partly in large lumps, being mostly very hard quartz, together with the small wear and tear compared with stamp-mills, these results speak favorably for the adoption of crushing by rolls.

Another interesting feature for mill-men has been well proven by this trial; it is the substitution of the exhaust-fan in the place of the finer sort of screen. Not that this idea is new, but I think it has never commanded the attention it deserves from mill-men. Screening through fine screens is, at best, a very imperfect and troublesome operation, and expensive at that, while I have fully satisfied myself that a proper application of the exhaust-fan would produce a uniformly-sized pulp with far less dust and at a much less cost.

APPENDIX.

MISCELLANEOUS STATISTICS.

THE BULLION PRODUCT.

The following is the estimate of the bullion product of 1875, published by Mr. Valentine, general superintendent of Wells, Fargo & Co.'s express.

OFFICE WELLS, FARGO & CO.,
San Francisco, December 30, 1875.

DEAR SIR: We inclose you herewith a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri River, including British Columbia and the west coast of Mexico, during 1875, which shows an aggregate yield of \$80,889,037, being an excess of \$6,487,982 over 1874, the greatest previous annual yield in the history of the coast. Nevada, Colorado, Mexico, Oregon, British Columbia, Montana, and Arizona increased, while California, Idaho, Utah, and Washington decreased. The increase is actual except for Mexico, Oregon, and Arizona, where it is apparent rather than real as compared with other years, a regular product being accounted for and reported herein, hitherto omitted. The decrease in California was in the main occasioned by a stinted supply of water for placer and hydraulic mining. The increase in Colorado and Nevada is notable, also the fact that Nevada yields more than half of the whole product of the country.

Professor R. W. Raymond credits New Mexico (omitted in our statement) and Arizona combined with \$987,000, which is a liberal allowance. We have been unable to obtain any data that justifies a showing so favorable.

Present prospects indicate an aggregate yield of \$90,000,000 for 1876, of which Nevada will doubtless produce \$50,000,000.

Respectfully yours,

JOHN J. VALENTINE,
General Superintendent.

Statement of the amount of precious metals produced in the States and Territories west of the Missouri River during 1875.

States and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by ex- press.	Ores and base bullion by freight.	Total.
California	\$14,842,010	\$1,484,201	\$357,768	\$1,039,172	\$17,753,151
Nevada	196,858	19,625	35,253,193	4,978,633	40,478,369
Oregon	759,133	405,913			1,165,046
Washington	74,517	7,415			81,932
Idaho	1,163,698	116,369	220,835	44,000	1,554,902
Montana	2,235,609	500,000	88,000	750,000	3,573,609
Utah	43,626	4,362	764,041	4,875,399	5,687,494
Arizona	21,500			85,593	109,093
Colorado	2,627,444		2,610,266	1,062,107	6,299,817
Mexico	68,117		1,716,184	624,370	2,408,671
British Columbia	1,615,412	161,541			1,776,953
	23,649,924	2,699,492	41,030,287	13,459,274	80,889,037

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The criticisms of Mr. Valentine concerning the product of New Mexico and Arizona are elsewhere considered. (See chapter X.)

My own estimate for the year 1875 is given in the introductory letter to this report. It is repeated in the following table, combined with the reports of the previous years since 1868. For the grounds on which the estimate of product for each State and Territory is based the reader is referred to the respective chapters of this report.

States and Territories.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
Arizona	\$1,000,000	\$200,000	\$200,000	\$625,000	\$500,000	\$487,000	\$750,000
California	22,500,000	25,000,000	20,000,000	19,049,098	18,025,722	20,300,531	17,753,151
Colorado	4,000,000	3,675,000	4,663,000	4,661,465	4,020,263	5,188,510	5,302,810
Idaho	7,000,000	6,000,000	5,000,000	2,695,270	2,500,060	1,890,004	1,750,000
Montana	9,000,000	9,100,000	8,050,000	6,068,339	5,178,047	3,844,722	3,573,600
Nevada	14,000,000	16,000,000	22,500,000	25,548,801	35,254,507	35,452,233	40,478,369
New Mexico	500,000	500,000	500,000	500,000	500,000	500,000	325,000
Oregon and Washington	3,000,000	3,000,000	2,500,000	2,000,000	1,585,784	763,605	1,246,978
Wyoming		100,000	100,000	100,000	50,000		
Utah		1,300,000	2,300,000	2,445,284	3,778,220	3,911,601	3,137,628
Other sources	500,000	525,000	250,000	250,000	250,000	100,000	500,000
Total	61,500,000	66,000,000	66,663,000	63,943,257	71,642,523	72,428,206	74,817,596

* Including Wyoming.

[From the San Francisco Commercial Herald.]

Receipts of treasure.

The following table comprises the receipts of treasure in this city, through Wells, Fargo & Co.'s express, during 1875:

FROM THE NORTHERN AND SOUTHERN MINES.

1875.	Silver bullion.	Gold bars, &c.	Coin.	Totals.
January	\$973,166	\$445,904	\$971,741	\$2,390,811
February	1,518,589	519,086	911,631	2,949,306
March	2,467,243	501,004	835,564	3,804,411
April	1,201,293	573,311	1,210,626	3,585,290
May	1,798,668	774,949	1,560,291	4,134,108
June	1,305,982	713,334	1,134,066	3,153,382
July	1,323,529	653,635	1,228,664	3,205,828
August	2,033,299	597,593	1,078,644	3,709,536
September	1,767,539	292,449	2,158,658	4,518,646
October	2,325,207	558,544	1,303,024	4,187,375
November	1,655,226	384,425	1,163,911	3,204,632
December	1,270,204	547,854	1,029,725	2,847,783
Totals	20,242,015	6,863,088	14,586,605	41,691,708
Totals, 1874	18,269,054	7,092,924	2,259,352	34,621,330
Totals, 1873	11,749,320	8,290,258	6,636,143	26,675,721
Totals, 1872	6,326,704	14,843,835	6,769,641	28,000,270
Totals, 1871	14,609,809	13,872,648	7,125,922	35,608,385
Totals, 1870	14,152,924	17,762,131	6,427,037	38,402,152

FROM THE NORTHERN COAST.

1875.	Silver bul- lion.	Gold bars, &c.	Coin.	Totals.
January		\$184,998	\$37,023	\$222,021
February		45,027	243,394	288,421
March		108,681	159,371	268,052
April		136,782	65,004	201,786
May		96,176	87,156	183,332
June		44,428	37,065	81,493
July		119,353	34,321	153,674
August		85,764	57,698	143,462
September		98,873	79,828	178,701
October		204,855	74,777	279,632
November		230,516	73,653	303,169
December		\$750	45,049	145,413
Totals	750	1,455,087	993,339	2,449,156
Totals, 1874	300	1,548,430	657,482	2,206,212
Totals, 1873	4,900	1,441,438	878,377	2,324,015
Totals, 1872		2,305,414	661,889	2,967,303
Totals, 1871	9,785	2,552,668	708,096	3,270,549
Totals, 1870		3,380,566	532,901	3,913,467

FROM THE SOUTHERN COAST.

January	1,200	16,410	39,854	57,464
February		3,515	20,251	23,766
March		10,895	24,952	35,847
April	1,685	9,930	21,839	33,454
May	2,300	8,705	43,458	54,463
June	5,000	11,324	48,655	64,979
July	3,550	10,396	30,394	44,240
August	477	17,434	38,416	56,327
September	1,200	17,747	50,766	69,713
October	13,211	17,764	32,811	63,786
November	13,000	10,278	53,047	76,325
December	19,237	15,109	142,675	177,021
Totals	60,860	149,407	547,118	757,385
Totals, 1874	9,547	208,445	383,465	601,457
Totals, 1873	3,688	180,537	570,013	754,238
Totals, 1872	3,884	274,249	564,477	842,610
Totals, 1871	5,750	347,627	551,413	904,790
Totals, 1870		399,888	844,548	1,244,436

Currency movement.

The annexed table exhibits the interior and coastwise receipts, (Wells, Fargo & Co.,) imports, (foreign,) and exports for the years 1873, 1874, and 1875:

	1873.	1874.	1875.
Interior receipts	\$28,755,679	\$36,097,261	\$43,466,378
Imports, (foreign)	5,539,147	5,473,482	5,223,875
Totals	34,294,826	41,570,743	48,690,253
Exports	24,715,126	30,180,032	42,911,048
Currency movement, (increase)	9,579,700	11,390,111	5,779,205

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Movement of coin in the interior.

The following has been the circulation of coin, through Wells, Fargo & Co.'s express, during 1875, as compared with the same period in 1874:

	1874.		1875.	
	To interior.	From interior and coastwise.	To interior.	From interior and coastwise.
January	\$1,394,487	\$714,862	\$1,802,652	\$1,048,618
February	1,108,611	714,944	1,249,485	1,175,276
March	963,314	575,643	3,180,038	1,019,887
April	1,312,070	661,032	1,611,934	1,297,523
May	1,573,629	837,327	2,297,097	1,690,903
June	1,552,281	922,986	1,697,106	1,219,784
July	1,917,597	857,834	2,393,840	1,293,375
August	2,001,436	934,119	2,552,520	1,174,758
September	2,035,615	980,914	3,671,205	2,289,255
October	2,294,193	1,010,046	2,300,546	1,410,613
November	1,950,320	1,005,496	2,284,189	1,289,611
December	1,813,910	1,085,096	2,269,130	1,217,445
Totals	19,937,363	10,300,299	26,709,802	16,127,065

Mint statistics.

The coinage at the branch mint in this city for 1875 compares with that in 1872, 1873, and 1874 as follows:

	1872.	1873.	1874.	1875.
January	\$840,750	\$900,000	\$279,000	\$2,355,000
February	1,210,000	1,219,400	1,994,000	1,681,000
March	1,127,750	1,140,000	3,958,000	2,482,000
April	1,420,000	1,282,000	1,752,000	3,458,000
May	2,030,000	2,772,000	367,000	2,794,000
June	666,000	652,000	2,393,000	1,172,000
July	2,245,000	3,082,000	2,309,000	2,508,000
August	730,000	2,131,000	4,320,000	4,510,000
September	1,264,500	2,264,500	2,570,000	2,648,000
October	1,895,000	2,658,000	3,204,000	3,118,000
November	1,525,000	254,500	96,000	2,023,000
December	1,436,600	3,720,000	4,087,000	2,720,000
Totals	16,380,600	22,075,400	27,329,000	32,069,000

The description of coinage for 1872, 1873, 1874, and 1875 was as follows:

	1872.	1873.	1874.	1875.
Double-eagles	\$15,600,000	\$20,812,000	\$24,375,000	\$24,600,000
Eagles	173,000	120,000	50,000	45,000
Half-eagles	202,000	155,000	35,000	29,000
Quarter-eagles	25,000	67,500	197,000	1,600,000
Half-dollars	290,000	116,500	98,000	170,000
Quarter-dollars	26,250	39,000	24,000	907,000
Dimes	19,000	45,500	16,250	700
Half-dimes	36,350	16,250	703,000	2,550,000
Silver dollars	9,000	700	4,487,000	231,000
Trade-dollars				
Twenty-cent pieces				
Totals	16,380,600	22,075,400	27,329,000	32,069,000

Exports of treasure.

Statement of the amount of treasure exported from San Francisco, through public channels, to eastern domestic and foreign ports during the year 1875, exclusive of shipments through United States mail:

TO NEW YORK.		
In January	\$940,432 95	
In February	5,023,547 14	
In March	5,697,596 15	
In April	2,435,050 22	
In May	2,569,693 54	
In June	5,703,670 99	
In July	2,461,868 70	
In August	794,727 83	
In September	1,320,834 25	
In October	5,861,703 96	
In November	859,825 09	
In December	899,638 55	
		\$34,568,594 37
TO ENGLAND.		
In January	\$15,537 38	
In February	16,404 46	
In March	15,503 68	
In April	11,532 85	
In May	12,973 96	
In June	18,101 42	
In July	20,417 37	
In August	16,798 73	
In September	20,490 88	
In October	25,335 92	
		173,146 64
TO PANAMA.		
In February	\$1,031 18	
In August	1,750 00	
In September	1,000 00	
In December	3,182 04	
		6,963 22
TO CENTRAL AMERICA.		
In January	\$40,000 00	
In March	38,190 03	
In April	15,670 00	
In June	15,311 85	
In August	14,000 00	
In October	10,000 00	
		133,171 88
TO HONOLULU.		
In January	\$10,000 00	
In September	10,000 00	
In October	10,000 00	
In November	10,000 00	
		40,000 00
TO MEXICO.		
In January	\$6,000 00	
In March	27,000 00	
		33,000 00
TO GERMANY.		
In December		10,591 04
TO JAPAN.		
In August		2,070 00
TO CHINA.		
In February	\$749,704 50	
In March	169,831 00	
In April	695,746 00	

458 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

In May	\$584,583 70	
In June	679,265 82	
In July	423,512 08	
In August	566,532 05	
In September	625,056 40	
In October	737,036 25	
In November	872,002 48	
In December	729,859 00	
		\$7,652,953 38
TO VICTORIA.		
In September	\$50,000 00	
In October	35,000 00	
In November	40,000 00	
		125,000 00
TO PERU.		
In October	\$165,000 00	
In November	200 00	
		165,200 00
TO MARQUESAS ISLANDS.		
In February		357 36
Total, 1875		42,911,047 89
Total, 1874		30,180,632 23
Increase this year		12,730,415 66

OTHER MINERAL STATISTICS OF THE PACIFIC COAST.

[From the San Francisco Commercial Herald.]

BORAX.

The entire product of merchantable borax produced on this coast, being wholly from the States of California and Nevada, amounted last year to about 5,000,000 pounds. Of this quantity, 1,300,000 pounds was the product of the Slate Range district, San Bernadino County, California, the balance coming nearly all from the Teel and the Fish Lake marshes, in the State of Nevada. Of the Slate Range production, 1,200,000 pounds were manufactured by the Riddle Company, while of the quantity made in Nevada, 2,140,000 pounds came from Teel's and 1,079,000 pounds from the Fish Lake marsh, some 500,000 pounds having been turned out at various other localities. William T. Coleman & Co., as agents of the principal Nevada companies, report shipments during the year 1875 as follows: To Liverpool and London, 2,659,375 pounds; to Hamburg, 215,799 pounds; to Bremen, 10,000 pounds; to China and Japan, 7,000 pounds; to Australia, 1,500 pounds; to Mexico, 1,300 pounds; to New York, 814,760 pounds; to Philadelphia, 124,158 pounds; besides 1,598,866 pounds sent east by rail, making a total of 5,433,658 pounds. Adding to this 627,685 pounds shipped by other parties, mostly by the Riddell Company, we have 6,051,343 pounds to represent the entire exports for the year. The Riddell Company, which made 600 tons last year, will increase their product to 1,000 tons the present year, the Nevada companies promising some, but not as large a percentage of increase, both the extent and the richness of the deposits there, as well as in California, appearing to have been considerably overrated by those who first examined and reported upon them. While these borate fields cover a broad area, the crude material is much less abundant and of lower grade than was at first supposed, admonishing the owners of these valuable

salines to economy in disposing of their contents. The mistaken notions in regard to the available quantities of these borates that early prevailed, filling foreign dealers with apprehensions of an immediate over-production, caused the rapid decline in price that has been going on for the past three years, during which this commodity fell from 28 cents to 6½ cents per pound. The correction of this erroneous idea has already caused a stiffening of prices, which, it is believed in well-informed quarters, must soon experience a material advance. Under vigorous working, the surface-deposits of our borate fields begin to show signs of early exhaustion, while those of South America, the only quarter in which we have reason to fear competition, cannot, by reason of their poverty in the borate of soda and their inaccessible position, be made available as sources of large supply at present prices. The Riddell Company having filled a considerable contract at 6½ cents per pound, decline to renew the same or take orders at 6½ cents, thinking better terms may soon be obtained. This company is in a prosperous condition; and having lately enlarged their works, as well as introduced some improvements in the methods of manufacturing, anticipate an increased production at somewhat lessened pro rata of cost. They have, furthermore, the benefit of skill and intelligence in the field and able financial management at headquarters. In disposing of their product the past year this company has sold some to British buyers here and sent the balance to eastern markets. At present they are separated from the railroad terminus by a space of 120 miles. As the track is advanced, this distance is being diminished, and will next year be reduced to 80 miles. This borax as it enters the market contains 95 per cent. boracic acid. Some small portions intended for special uses or certain branches of the trade being further purified and refined at the establishments here and in Oakland, an extra price is obtained for this commodity, though for most uses it is no better, and for some not so good as the ordinary article of commerce. As the dealer here has to find his principal market abroad, he is forced to place himself in accord with the foreign agent, subordinating his views and line of policy to those of the latter. Just now certain European scientists are exercising themselves to discover some new uses to which this substance can be economically applied, and it is not unlikely that their endeavors will be rewarded with success. Until it shall appear, however, that there is likely to occur a much greater production than now seems probable, these efforts can hereby be considered well directed. At the close we quote concentrated, in sacks, by the car-load, 6½@7 cents. The regular agency price for concentrated by the car-load is 7½@8½ cents; refined 9¼@9¾ cents.

Exports by sea during 1874 and 1875.

To—	1874.			1875.		
	Cases.	Pack-ages.	Value.	Cases.	Pack-ages.	Value.
New York.....	3, 517	2, 012	\$101, 546	262	5, 469	\$61, 430
England.....	3, 632	2, 031	146, 126	3, 571	17, 114	212, 665
China.....	225	45	3, 892	62	.....	559
Japan.....	160	72	3, 231	17	.....	168
Mexico.....	27	.....	898	17	.....	220
Germany.....	1, 944	1, 034	40, 225	1, 406	348	16, 436
Belgium.....	60	.....	720	.....	.....	.....
Australia.....	42	.....	504	15	.....	293
British Columbia.....	6	.....	76	2	1	39
Peru.....	10	5	235	.....	.....	.....
Society Islands.....	1	.....	15	.....	.....	.....
Totale.....	14, 624	5, 199	297, 472	4, 992	22, 952	294, 770

CEMENT, PLASTER, AND LIME.

	Barrels
Imports in 1871.....	32,600
Imports in 1872.....	54,740
Imports in 1873.....	61,910
Imports in 1874.....	79,430
Imports in 1875.....	96,930

The receipts of both Rosendale and Portland cement during 1875 show a large increase over those of the previous year, Prices in consequence have ruled low and unremunerative all the year; stocks large. The manufacture of cement upon this coast now is a perfect success, the Golden Gate Mill making a first-class article, fit for every purpose, out of gypsum, and is selling at \$3@33.25 per barrel, and can be supplied in any quantity. The ship *Oriflamme* has arrived from London with 2,250 barrels Portland cement. This article is largely used for making Freestone (patent) stone, and is preferred to all other for fine work. It may be quoted ex ship at \$4@4.50 per barrel, while Hoffman's Rosendale is held at \$3@33.25, and Lawrenceville do. at \$2.50@2.75. Lime is produced here in endless quantity from Santa Cruz marble, and is of very superior quality, commanding \$2@2.25 per barrel. The Doune Castle from London has 2,000 barrels Portland cement.

Our monthly receipts of California lime compare as follows:

Months.	1874.	1875.	Months.	1874.	1875.
	Bbls.	Bbls.		Bbls.	Bbls.
January.....	5,440	8,797	July.....	14,098	21,240
February.....	5,500	9,529	August.....	11,634	24,060
March.....	6,350	11,532	September.....	16,102	18,900
April.....	8,128	15,153	October.....	17,003	13,440
May.....	12,682	21,341	November.....	12,613	7,900
June.....	19,182	23,541	December.....	14,899	8,120
Totals.....				143,513	182,630
Increase in 1875.....					39,117

COAL.

Annual receipts of coal at San Francisco.

Year.	Mount Diablo.	Coos Bay.	Bellingham Bay.	Vancouver Island.	Chili.	Australia.	English.	Cumberland.	Anthracite.	Seattle.	Rocky Mountain.	Other countries.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1860.....	3,145	5,490	6,055	1,900	7,850	6,640	5,970	39,955	.....	.....	.....	.....	77,630
1861.....	6,620	4,630	10,055	6,475	12,495	24,370	21,565	2,975	26,060	.....	.....	.....	116,240
1862.....	23,400	2,815	10,050	9,870	5,110	1,590	16,055	4,970	36,665	.....	.....	.....	120,540
1863.....	43,200	1,185	7,750	5,740	1,790	16,690	14,660	5,670	38,660	.....	.....	.....	135,550
1864.....	50,700	1,900	11,845	12,785	2,323	21,160	18,330	7,275	41,685	.....	.....	.....	167,290
1865.....	60,530	1,500	14,446	19,151	1,410	17,610	9,655	4,230	22,555	.....	.....	.....	150,140
1866.....	84,020	2,120	11,380	10,852	1,480	53,760	7,400	9,524	12,124	.....	.....	.....	192,600
1867.....	109,490	5,415	2,899	14,829	14,949	26,619	7,362	12,177	4,516	.....	.....	737	246,920
1868.....	132,537	10,324	13,266	23,348	7,511	31,530	29,561	2,292	29,592	.....	.....	204	286,010
1869.....	148,722	14,821	20,552	14,780	1,114	75,115	17,326	11,536	24,244	.....	.....	.....	322,970
1870.....	129,761	20,567	14,355	12,640	7,350	83,982	31,196	9,322	21,320	.....	.....	.....	320,490
1871.....	133,455	25,690	20,254	15,621	4,161	38,942	54,191	6,060	7,231	4,918	1,025	583	315,190
1872.....	177,822	32,562	4,100	26,068	3,682	115,332	29,190	10,051	19,618	14,830	1,862	.....	434,460
1873.....	171,741	38,066	21,211	31,435	400	90,435	52,616	8,857	18,295	13,572	1,904	5	454,580
1874.....	206,255	44,537	13,685	51,017	.....	139,108	37,825	15,475	14,263	9,027	433	.....	531,940
1875.....	142,822	32,569	10,445	61,072	.....	136,769	57,849	10,322	12,810	67,106	53	.....	538,208

In making this exhibit, it should be stated that the Central Pacific Railroad handled much of their own coal, bringing it from the Lincoln Mine, California, and Rocky Mountain, from Wyoming Territory. They also use more or less Mount Diablo; and of all this consumed by the railroad we take no account in our statistics. The Pacific Mail Company have a contract with the Wellington (V. I.) coal-mine for a large monthly supply, and only what is landed here enters into our statistics. The same company are now seeking to make a like contract with the Seattle Mine, Washington Territory. The Coos Bay Company have been much interrupted the past six months in getting their coal to market, by reason of loss of one of their best steam-colliers, adverse winds, stormy weather, and bad luck generally. The great falling off in the Mount Diablo product is remarkable, and at this writing we have no cause to assign for it. The Seattle mines, Washington Territory, show a large increase in their product, as do also the Wellington and Nanaimo mines of Vancouver Island. These three last-named bituminous enter very largely into local use for household purposes. There have been times during the year when Lehigh ran short of supply by reason of the non-arrival of ships, causing very high prices to rule, and necessitating the bringing of a few car-loads across the continent by rail; but all that is now remedied and overcome by reason of fresh arrivals by sea—the Centennial having some 500 tons, and the ship Golden Fleece 1,750 tons Lehigh. These, with other lesser invoices recently at hand, have caused prices to drop from \$25 to \$15 per ton; in fact, we doubt whether these cargo parcels could be placed better than \$12. So, also, in regard to Cumberland, by reason of the non-arrival of the ship Itasca, 253 days out from Baltimore, supplies threatened to give out; but dealers in the trade purchased from outsiders 1,000 tons or more, and now that the ship has safely arrived in port, and no more to arrive in some four months, prices of Cumberland in casks have been fixed to dealers at \$22, and in bulk at \$18. The supply of Sydney has been very constant all the year, and during the last quarter thereof cargo sales of steam were made as low as \$8.50@ \$8.75. At this writing, Wallsend may be quoted at \$9.25@ \$9.50, ex ship. The importation of Australian steam-coals during the year has not been profitable, and the same remarks are, no doubt, applicable to both Scotch and English steam. We quote: Bellingham Bay at \$8.50; Coos Bay, \$10; California Mount Diablo steam, \$6.25@ \$8.25 for fine and coarse, respectively; English and Scotch steam, \$9@ \$10; Nanaimo, \$9.50@ \$10; Seattle, \$9.50@ \$10; Anthracite, \$12@ \$15; Lehigh, \$15@ \$16. Imports during the week embrace the following: Prince Robert, 600 tons Wellington; Gem of the Ocean, 1,011 tons Seattle; Hannibal, from Newcastle, N. S. W., 1,662 tons; Marmion, 1,200 tons from Seattle.

QUICKSILVER PRODUCTION AND TRADE OF CALIFORNIA.

The exports to the different countries for 1875 and the three previous years were as follows:

To—	1872.	1873.	1874.	1875.
New York	1,202	.....	315	287
China	4,810	1,900	1,200	18,190
Mexico	5,038	3,761	4,114	5,757
South America	1,300	508	738	2,149
Australia	643	105	100	832
British Columbia	2	11	2	17
Other countries	103	74	311	1,728
Total flasks	13,098	6,359	6,770	28,960

And our exports previously have been :

	Flasks.		Flasks.
In 1871	15,205	In 1861	35,993
In 1870	13,788	In 1860	9,441
In 1869	24,415	In 1859	3,398
In 1868	44,506	In 1858	24,143
In 1867	22,853	In 1857	27,263
In 1866	30,287	In 1856	23,740
In 1865	42,469	In 1855	27,163
In 1864	36,927	In 1854	20,963
In 1863	26,014	In 1853	12,737
In 1862	33,747	In 1852	900

Exports by sea during 1874 and 1875.

To—	1874.		1875.	
	Flasks.	Value.	Flasks.	Value.
New York	315	\$35,696	297	\$17,253
Mexico	4,104	426,249	5,757	375,120
Chili	404	39,888	355	24,600
New Zealand	51	5,343	238	14,070
Bolivia	134	13,805		
China	1,200	135,878	18,190	1,003,840
Japan	248	27,751	968	56,110
Central America	12	1,193	34	1,790
British Columbia	2	207	17	93
England			100	7,650
South America	200	22,185	2,149	154,180
Australia	100	11,475	832	47,900
Calcutta			10	550
Russian Asia			3	193
Totals	6,770	719,674	28,960	1,704,410

The total receipts at the tide-water from all the cinnabar-mines of the State exceed 50,000 flasks, while the exports by sea are 35,000. The shipments east overland during the year have been larger than usual, while the consumption of the "bonanza" and other mines has been considerably more than ever before, and promises to be even greater in the near future. Colorado gets her supply via New York cheaper than it can be procured from this coast, owing to lessened transportation-charges. Our accumulated stock is very small, the export trade and home consumption thus far taking it off as fast as brought to market. This shows conclusively that a low price greatly favors increased consumption in China, Mexico, and in fact the world over. The overland exports of 1875 were 10,434 flasks; of 1874, 5,859 flasks; increase in 1875, 4,575 flasks. Our monthly receipts of this article compare with 1874 as follows :

Months.	1874.		1875.	
	Bay.	Coast.	Bay.	Coast.
January	Flasks. 972	Flasks. 25	Flasks. 1,005	Flasks. 2
February	1,709		3,254	305
March	1,830		3,779	465
April	1,862		3,718	100
May	1,964	20	3,298	303
June	1,845		3,776	320
July	1,923		4,229	428
August	2,132	15	4,016	268
September	2,840	24	4,746	292
October	2,821	9	4,899	151
November	2,095		5,278	203
December	2,089		4,537	241
Totals	23,591	93	47,165	3,053
Increase in 1875			23,574	2,995

SALT.

<i>Imports.</i>			<i>Exports.</i>		
	1874.	1875.		1874.	1875.
Tons	2,811	3,092	Tons	220	147
Sacks	15,390	24,814	Bags	911	1,597
Cases	200	60			

Prices December 31, 1875: California, \$12.50 per ton; Liverpool coarse, \$12 to \$15; factory filled, \$17 to \$18.50 per ton.

Tabular statement of assessments and dividends, from the Daily Stock Report assessment-list, San Francisco, January 17, 1876.

Companies.	Number assessment.	Number feet in mine.	Number shares in mine.	Last assessment levied.	Amount per share.	Number dividends.	Last dividend.	Amount per share.	Total amount assessed.	Total amount disbursed.	Amount assessment per share.	Amount dividend per share.
CALIFORNIA MINES.												
Booth	1	1,850	40,000	Mar. 31, 1875	\$0 15	9	Apr. 8, 1874	\$0 50	\$6,000	\$210,000	\$0 15	\$27 00
Consolidated Amador	11	8,000	30,000	Feb. 17, 1875	50				111,000		5 55	
Bellevue	5	3,600	60,000	Nov. 9, 1875	50	4	Feb. 6, 1873	50	45,000	24,000	2 00	1 00
Calistoga	5	1,500	34,000	Dec. 11, 1875	10	4	Nov. 16, 1874	40	45,000	51,000	1 60	1 70
Crocker	1	1,600	100,000			76	Dec. 8, 1873	1 00		2,054,000		103 70
DeLance	9	1,800	25,000	Sept. 11, 1875	50	1	May 3, 1875	50	108,000		4 32	50
Genesee Valley	4	3,300	60,000	Oct. 9, 1875	50	10	Feb. 10, 1874	50	72,600	5,000	1 10	
Independent	11	1,800	100,000	Oct. 28, 1875	50				50,000		8 00	
Keystone Quartz	1	5,250	100,000	Aug. 12, 1875					160,000			
New Coso	5	10,500	100,000									
St. Patrick	5	400	10,000	Nov. 9, 1874	10	9	Apr. 10, 1872	50	9,000	40,000	90	4 06
Wander Consolidated												
Yule Gravel												
WASHOE MINES.												
Alamo	1	3,000	30,000	Nov. 2, 1872	25				7,500		25	
Amazon Consolidated	1	1,500	60,000	Sept. 20, 1875	10				6,000		10	
American Flat South	7	1,200	30,000	Aug. 12, 1875	1 00				180,000		6 00	
Alpha Consolidated	2	1,500	100,000	Aug. 27, 1875	50				120,000		5 50	
Alta	6	2,000	100,000	Apr. 30, 1875	1 00				985,000		2 25	
American Flat	2	65	95,000	Mar. 8, 1875	50				13,500		50	
Andes Mill and Mining Company	3	2,100	54,000	Oct. 7, 1875	1 00				573,000		6 88	
Baltic Consolidated	10	1,050	60,000	July 13, 1874	50				128,192		6 08	
Bell & Paxton	9	1,040	100,000	Apr. 14, 1871	4 00	34	Jan. 10, 1876	1 00	660,400	15,063,300	6 35	136 01
Best & Belcher	8	1,140	100,000									
Bonanza	80	20	5,000									
Bowers												

Bullion	9434	100,000	Aug. 6, 1872	1 50	1,802,000	18 02
Buckeye	16	3,000	Dec. 28, 1875	50	960,000	13 25
California	15	24,000	Nov. 1, 1875	3 00	930,000	47 50
Central Comstock	8	30,000	Oct. 14, 1875	5 00	1,022,000	36 50
Challenger Consolidated	1,400	28,000	Mar. 18, 1873	1 00	943,840	78,000
Chollar-Protol	1,200	100,000	June 11, 1876	084	411,200	14,040,000
Columbia	1,200	100,000	Aug. 4, 1873	75	50,000	3 81
Comstock	750	100,000	Aug. 11, 1875	25	50,000	50
Confidence	10	130	Jan. 10, 1876	1 00	773,370	115 86
Consolidated Virginia	15	24,000	Dec. 30, 1875	25	37,500	1 25
Consolidated Gold Hill Quartz	1	108,000	Dec. 30, 1875	50	232,000	56,000
Consolidated Washoe	343	20,000	Sept. 13, 1873	1 104	400,000	4 00
Cosmopolitan	2	1,200	Dec. 30, 1875	1 20	120,000	2 20
Cromer	500	40,000	Feb. 5, 1875	1 00	120,000	2 20
Crown Point Extension	94	30,000	Oct. 17, 1873	50	12,500	30
Crown Point	3	30,000	Sept. 4, 1873	50	491,400	713,500
Daney	15	2,000	July 23, 1875	25	160,000	1 80
Dayton	4	1,000	Feb. 9, 1874	3 00	112,500	2 25
Dexter	2	1,200	Nov. 5, 1875	50	10,000	10
Dardanelles	1	70	Sept. 20, 1873	10	6,000	10
Eclipse Winters Plats	20	75	Dec. 3, 1873	50	190,000	5 00
Empire Mill	4	1,000	June 18, 1875	10	10,000	10
Europa	10	100,000	Oct. 10, 1870	10 00	1,640,000	15 15
Exchequer	3	1,200	Oct. 20, 1875	1 00	3,896,800	35 43
Fairmount	10	100,000	Nov. 9, 1875	50	1,000,000	99 88
Florida	3	1,200	June 10, 1868	6 00	1,067,500	16 70
Franklin	1	1,200	Apr. 10, 1871	5 00	1,598,000	110 62
Genesee	1	1,500	June 10, 1868	6 00	1,067,500	16 70
Globe Consolidated	7	4,200	Sept. 13, 1873	10	10,500	35
Georgia	1	1,200	May 21, 1875	10	10,000	10
Golden Fleece	9	100,000	May 12, 1875	9 00	548,700	18 80
Gould & Curry	24	619	Nov. 9, 1875	1 00	872,500	8 673
Green	1	1,524	Nov. 9, 1875	5 00	270,000	15 50
Grand	1	2,500	June 10, 1868	6 00	372,000	15 50
Halo & Norcross	46	16,000	Mar. 10, 1870	5 00	297,000	9 75
Harford	3	1,400	Dec. 4, 1875	1 00	450,000	4 50
Imperial	95	184	Sept. 6, 1875	50	138,000	3 50
Independent and Omega	9	2,400	Jan. 13, 1876	50	100,000	1 00
Little Consolidated	99	3,000	Aug. 6, 1875	50	100,000	1 00
Little Consolidated	17	2,000	Jan. 1, 1875	3 00	100,000	1 00
Justice	19	95	May 12, 1875	9 00	100,000	1 00
Kentuck	14	1,200	Nov. 9, 1875	1 00	100,000	1 00
Knickbocker	5	2,000	Dec. 28, 1875	75	100,000	1 00
Kosuth	10	5,000	Oct. 4, 1875	1 00	100,000	1 00
Lady Bryan	6	1,223	Nov. 30, 1875	50	100,000	1 00
Lady Washington	4	1,600	Sept. 6, 1875	50	100,000	1 00
Leo	2	2,000	Jan. 13, 1876	50	100,000	1 00
Leviathan	9	2,000	Jan. 13, 1876	50	100,000	1 00

Tabular statement of assessments and dividends, &c.—Continued.

Companies.	Number assessment	Number feet in mine.	Number shares in mine.	Last assessment levied.	Amount per share.	Number dividends.	Last dividend.	Amount per share.	Total amount dividends disbursed.	Amount assessment per share.	Amount dividend per share.
WASHOE MINES—Continued.											
Lower Comstock.	1	300	86,000	Mar. 22, 1875	\$0 50					\$0 50	
Maryland.		900	54,000								
Mexican.	1	600	108,000	Jan. 6, 1876	90					1 50	
Middle.	12	200	30,000	Apr. 17, 1875	25					25 50	
Mint.	1	1,500	90,000	June 3, 1875	25					25	
Monumental.	1	1,600	80,000	Oct. 27, 1875	75					4 20	
Morning Star.	7	1,000	100,000	Apr. 16, 1875	50					45	
New York.	1	1,500	100,000	Dec. 16, 1875	10					50	
Niagara.	3	1,500	100,000	Oct. 6, 1875	50					1 00	
North Carson.	1	1,706	40,000	Feb. 2, 1875	50					20 18	\$13 83
North Consolidated Virginia.	4	3,000	30,000	Aug. 26, 1875	90		Mar. 9, 1884	\$4 00	\$1,394, 000	48 66	
North Consolidated Virginia.	29	675	100,500	May 14, 1875	3 00	23					
North Utah.	33	1,200	38,400	Oct. 12, 1875	3 00						
Occidental.	1	1,200	100,000	Feb. 3, 1875	90						
Og Gold Hill.	1	1,500	50,000	Aug. 6, 1875	50						
Ophir.	9	1,200	24,000	Nov. 26, 1875	25						
Original Flawery.	3	1,500	100,000	Jan. 8, 1876	50						
Overman.	10	1,500	100,000	Dec. 17, 1875	1 00	52	June 11, 1869	3 00	4,460, 000	19 51 1	39 88
Pacific.	21	771	112,000	May 26, 1875	35						
Patterson.	1	400	6,400	July 20, 1871	5 00						
Phil Sheridan.	3	1,500	100,000	Aug. 27, 1875	10						
Pieton.	9	1,500	100,000	Jan. 8, 1876	50						
Pioneer Consolidated.	10	1,500	100,000	Dec. 17, 1875	1 00	52	June 11, 1869	3 00	4,460, 000	19 51 1	39 88
Prospect.	21	771	112,000	May 26, 1875	35						
Rock Island.	2	1,500	100,000	July 20, 1871	5 00						
Savage.	13	1,500	100,000	Aug. 27, 1875	10						
Scorpion.	2	1,500	100,000	Jan. 8, 1876	50						
Segregated Balcher.	13	1,500	100,000	Dec. 17, 1875	1 00	52	June 11, 1869	3 00	4,460, 000	19 51 1	39 88
Senator.	2	1,500	100,000	May 26, 1875	35						
Segregated Caledonia.	13	1,500	100,000	July 20, 1871	5 00						
Segregated Gold Hill.	2	1,500	100,000	Aug. 27, 1875	10						
Segregated Rock Island.	1	1,500	100,000	Jan. 8, 1876	50						
South California.	3	1,500	100,000	Dec. 17, 1875	1 00	52	June 11, 1869	3 00	4,460, 000	19 51 1	39 88
South Comstock.	1	1,500	100,000	May 26, 1875	35						
South Justice.	1	1,500	100,000	Nov. 12, 1875	25						

WHITE FINE MINES.									
South Overman	3	1,500	30,000	Aug. 6, 1875	1 00		60,000		9 00
South Star	2	1,200	46,000	Feb. 17, 1875	50		24,000		1 00
Sutro	2	2,400	94,000	Aug. 3, 1875	10		16,500		15
Silver Central Consolidated	2	3,000	110,000	Aug. 3, 1875	25		8,000		23
Silver Cloud	7	3,000	38,000	Mar. 19, 1874	1 00		702,000		13 00
Silver Hill	42	3,300	54,000	Oct. 1, 1875	1 00	11 Jan. 16, 1871	102,500		1 08
Sierra Nevada	7	3,300	100,000	Oct. 1, 1875	50	2 Oct. 16, 1871	28,800		1 00
Succor Mill and Mining	13	3,800	68,410	Dec. 30, 1875	50		370,500		5 43
Trench	1	20	5,000	Oct. 17, 1873	1 00		5,000		1 00
Tyler	8	2,900	33,000	Dec. 21, 1875	30		72,600		9 20
Union Consolidated	11	1,000	100,000	Oct. 11, 1875	2 00		160,000		1 60
Utah	11	1,200	30,000	Oct. 19, 1875	2 00		300,000		15 00
Ward	3	1,000	40,000	Sept. 14, 1875	20		32,400		30
Wells Fargo	3	1,000	105,000	Nov. 4, 1875	1 00		681,000		5 87
Whitman	12	1,700	120,000	Sept. 30, 1875	5 00	25 Aug. 10, 1871	2,184,000		98 25
Woodville	21	957	24,000						91 00
Yellow Jacket									
IDAHO MINES.									
General Leo	6	1,000	20,000	Jan. 9, 1873	25		15,000		75
Geneva Consolidated	6	3,000	50,000	Oct. 11, 1875	20		72,500		1 45
Hayes	7	1,000	40,000	Aug. 18, 1875	20		66,000		1 65
Mammoth	19	1,800	36,000	Aug. 18, 1875	15		104,400		2 90
Or Hidden Treasure	11	21,333	21,333	Oct. 12, 1874	1 00	1 June 10, 1870	31,999		1 50
Silver Wave	12	1,600	20,000	July 31, 1875	25		330,061		15 50
Ward Ellis	3	2,000	40,000	Feb. 10, 1875	5		165,000		8 25
							10,000		25
Empire	12	1,880	25,000	Jan. 5, 1876	25		307,500		12 75
Golden Chariot	15	1,880	90,000	Dec. 13, 1875	75	13 Oct. 24, 1873	577,500	500,000	5 53 1/2
Ida Elmore	19	4,000	30,000	Oct. 16, 1875	50	6 Feb. 8, 1870	730,000	60,000	17 60
Illinois Central	4	1,000	30,000	Oct. 12, 1875	50		37,500		1 25
Mahogany	16	720	50,000	July 15, 1875	2 00	1 Aug. 5, 1872	240,000	15,000	9 80
Panor	6	1,600	50,000	Nov. 9, 1875	20		25,000		50
Poor Man	4	50,000	50,000	Nov. 24, 1875	20		125,000		2 50
Silver Cord	10	660	94,000	July 20, 1875	1 00		174,000		8 50
South Chariot	15	660	50,000	Sept. 13, 1875	25		350,000	11,500	9 00
South Mountain Consolidated	10	1,000	100,000	Aug. 9, 1875	2 00		300,000		2 00
War Eagle	10	1,000	20,000	June 30, 1875	1 00		120,000		12 00
Red Jacket	8	1,600	20,000	Dec. 16, 1875	1 25		115,000		5 75
CORNUCOPIA DISTRICT.									
Constitution	2	1,500	50,000	Oct. 20, 1875	10		12,500		25
Cornucopia Consolidated		3,000	100,000						
Hussey									
Leopard	2	1,500	50,000	Oct. 20, 1875	25	2 July 13, 1875	50,000		1 00
Panther	2	1,500	50,000	Oct. 20, 1875	10		22,500		45
Tiger	2	1,500	50,000	Oct. 20, 1875	10		12,500		25
Beaver		1,500	50,000						

Tubular statement of assessments and dividends, &c.—Continued.

Companies.	Number assessment.	Number feet in mine.	Number shares in mine.	Last assessment levied.	Amount per share.	Number dividends.	Last dividend.	Amount per share.	Total amount assessments levied.	Total amount dividends disbursed.	Amount assessment per share.	Amount dividend per share.
ELY DISTRICT.												
American Flag	7	7	40,000	Mar. 26, 1875	\$0 50	.....	.....	.....	\$260,000	.....	\$6 50	.....
Alps	8	8	30,000	Feb. 10, 1875	25	.....	.....	.....	105,000	.....	3 50	.....
Bowery	6	6	30,000	Dec. 15, 1874	20	.....	.....	.....	94,500	.....	3 15	.....
Chapman	4	4	30,000	July 26, 1873	25	.....	.....	.....	37,500	.....	1 25	.....
Chief of the Hill	6	6	30,000	Mar. 26, 1875	25	.....	.....	.....	75,000	.....	2 50	.....
Condor	4	4	25,000	July 9, 1875	50	.....	.....	.....	50,000	.....	2 00	.....
Huhn & Hunt	11	3,600	30,000	May 7, 1875	50	.....	.....	.....	264,000	.....	7 55	.....
Ingotmar	7	1,000	40,000	May 4, 1874	25	.....	.....	.....	70,000	\$50,000	1 75	.....
Louise	3	2,400	30,000	Sept. 15, 1872	50	.....	.....	.....	21,000	.....	70	.....
Meadow Valley	10	8	60,000	Dec. 28, 1875	50	17	June 16, 1873	\$1 00	1,200,000	1,200,000	6 00	\$30 00
Newark	12	900	35,000	Sept. 14, 1875	50	.....	.....	.....	304,800	.....	9 55	.....
Page & Panacs	8	24,000	40,000	Oct. 6, 1874	75	.....	.....	.....	190,000	.....	4 75	.....
Phoenix	14	11	50,000	Apr. 21, 1874	50	.....	.....	.....	337,500	.....	6 75	.....
Pioche	8	1,000	20,000	Dec. 1, 1875	1 00	3	Aug. 5, 1872	1 00	171,500	.....	11 50	3 00
Pioche West Extension	5	5	35,000	July 12, 1875	25	.....	.....	.....	510,000	.....	2 86	.....
Portland	8	5,000	30,000	Aug. 21, 1874	3 00	23	Sept. 10, 1873	3 00	105,000	3,075,000	17 00	105 50
Raymond & Ely	6	5	30,000	Nov. 5, 1875	50	.....	.....	.....	42,5 0	.....	3 50	.....
Silver Peak	5	5	30,000	Mar. 29, 1875	10	.....	.....	.....	105,000	.....	85	.....
Silver West Consolidated	9	5	20,000	Dec. 7, 1875	10	.....	.....	.....	32,000	.....	7 35	.....
Spring Mountain Tunnel	15	1,520	30,000	May 22, 1874	75	.....	.....	.....	315,000	.....	10 50	.....
Washington and Creole	1	.....	.....	Sept. 27, 1875	1 00	.....	.....	.....	30,000	.....	1 00	.....
Watson	.....	.....	.....	Nov. 16, 1874	.....	.....	.....	.....	.....	.....	.....	.....
MISCELLANEOUS.												
Wellington	4	4	50,000	Feb. 17, 1874	25	.....	.....	.....	55,000	.....	1 10	.....
Adams Hill	6	6	50,000	Feb. 16, 1875	15	.....	.....	.....	57,000	1,000,000	1 15	20 00
Eureka Consolidated	7	7	50,000	June 23, 1873	50	.....	.....	.....	102,500	.....	1 05	.....
Jackson	1	1	30,000	Apr. 3, 1874	1 00	4	Sept. 15, 1873	25	50,000	50,000	1 00	.....
K. K. Consolidated	7	1,000	20,000	July 30, 1873	50	4	Mar. 5, 1875	25	82,500	37,500	2 75	1 53
Kys Patch	4	4	20,000	Dec. 4, 1875	50	.....	.....	.....	382,500	.....	6 50	.....
El Dorado, north	7	7	20,000	Aug. 4, 1874	1 00	.....	.....	.....	32,500	.....	50	.....
El Dorado, south, consolidated	8	2,600	40,000	Dec. 31, 1875	1 00	.....	.....	.....	357,500	.....	8 75	.....
Josephine	1	.....	25,000	July 30, 1874	15	.....	.....	.....	3	.....	15	.....

[illegible]

470 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

The ratios of gold to silver from 1760 to 1833.

[From the Report of the Director of the Mint.]

Years.	Pure gold to pure silver.	Years.	Pure gold to pure silver.
1760.....	1 to 14.20	1797.....	1 to 15.12
1761.....	1 to 13.94	1798.....	1 to 15.12
1762.....	1 to 14.63	1799.....	1 to 14.14
1763.....	1 to 14.71	1800.....	1 to 14.14
1764.....	1 to 14.91	1801.....	1 to 14.14
1765.....	1 to 14.69	1802.....	1 to 15.12
1766.....	1 to 14.41	1803.....	1 to 14.14
1767.....	1 to 14.45	1804.....	1 to 14.14
1768.....	1 to 14.58	1805.....	1 to 15.12
1769.....	1 to 14.45	1806.....	1 to 14.14
1770.....	1 to 14.35	1807.....	1 to 14.14
1771.....	1 to 14.36	1808.....	1 to 14.14
1772.....	1 to 14.19	1809.....	1 to 16.12
1773.....	1 to 14.73	1810.....	1 to 16.12
1774.....	1 to 15.05	1811.....	1 to 15.12
1775.....	1 to 14.62	1812.....	1 to 15.12
1776.....	1 to 14.34	1813.....	1 to 14.14
1777.....	1 to 14.04	1814.....	1 to 15.12
1778.....	1 to 14.34	1815.....	1 to 16.12
1779.....	1 to 14.89	1816.....	1 to 13.12
1780.....	1 to 14.43	1817.....	1 to 15.12
1781.....	1 to 13.33	1818.....	1 to 15.12
1782.....	1 to 13.54	1819.....	1 to 15.12
1783.....	1 to 13.78	1820.....	1 to 15.12
1784.....	1 to 14.90	1821.....	1 to 15.12
1785.....	1 to 15.21	1822.....	1 to 15.12
1786.....	1 to 14.89	1823.....	1 to 15.12
1787.....	1 to 14.83	1824.....	1 to 15.12
1788.....	1 to 14.71	1825.....	1 to 15.12
1789.....	1 to 14.89	1826.....	1 to 15.12
1790.....	1 to 15.01	1827.....	1 to 15.12
1791.....	1 to 14.95	1828.....	1 to 15.12
1792.....	1 to 14.43	1829.....	1 to 15.12
1793.....	1 to 15.01	1830.....	1 to 15.12
1794.....	1 to 15.32	1831.....	1 to 15.12
1795.....	1 to 14.77	1832.....	1 to 15.12
1796.....	1 to 14.77	1833.....	1 to 15.12

NOTE.—The highest value of silver compared with gold, from 1760 to 1833, was in 1781, when 13 ounces of the former were equal to one of the latter. In 1809 it required 16½ ounces of silver to purchase an ounce of gold; the difference represents a change of 14½ per cent. Taking 1771 as the year of the highest relative valuation of silver and the average of the first seven months of 1876 as the lowest shows a change within a period of 95 years of 34 per cent.

showing the yearly averages of the price of silver from 1834 to 1876, and the corresponding relative values of gold to silver, (prepared from quotations furnished by Pixley & Co., London.)

[From the Report of the Director of the Mint.]

Years.	Price per ounce, British stand- ard.	Price per ounce, United States standard, in United States gold coin.	Value of a silver dollar of 412½ grains.	Relative value of gold to silver.
	<i>Pence.</i>	<i>Cents.</i>	<i>Cents.</i>	
59 15 16	118.25	101.62	161.62	1 to 15.73
59 11-10	117.76	101.90	161.90	1 to 15.79
60	118.37	101.72	161.72	1 to 15.71
59 9-16	117.51	100.98	160.98	1 to 15.83
59 1-2	117.39	100.88	160.88	1 to 15.85
60 3-8	119.11	102.36	162.36	1 to 15.61
60 3-8	119.11	102.36	162.36	1 to 15.61
60 1-16	118.80	101.23	161.23	1 to 15.70
59 7-16	117.96	100.77	160.77	1 to 15.86
59 3-16	116.77	100.34	160.34	1 to 15.93
59 1-2	117.39	100.88	160.88	1 to 15.85
59 1-4	116.90	100.46	160.46	1 to 15.91
59 5-16	117.02	100.56	160.56	1 to 15.89
59 11-16	117.76	101.20	161.20	1 to 15.79
59 1-2	117.39	100.88	160.88	1 to 15.85
59 3-4	117.88	101.30	161.30	1 to 15.78
60 1-16	118.50	101.83	161.83	1 to 15.70
61	120.35	103.42	163.42	1 to 15.46
60 1-2	119.36	102.57	162.57	1 to 15.58
61 1-2	121.33	104.26	164.26	1 to 15.33
61 1-2	121.33	104.26	164.26	1 to 15.33
61 5-16	120.96	103.85	163.85	1 to 15.38
61 5-16	120.96	103.85	163.85	1 to 15.38
61 3-4	121.23	104.69	164.69	1 to 15.27
61 5-16	120.96	103.85	163.85	1 to 15.38
62 1-16	122.44	105.22	165.22	1 to 15.19
61 11-16	121.70	104.58	164.58	1 to 15.28
60 13-16	119.98	103.10	163.10	1 to 15.50
61 7-16	121.21	104.16	164.16	1 to 15.35
61 3-8	121.09	104.06	164.06	1 to 15.36
61 3-8	121.09	104.06	164.06	1 to 15.36
61 1-16	120.47	103.52	163.52	1 to 15.44
61 1-8	120.59	103.63	163.63	1 to 15.42
60 9-16	119.48	102.67	162.67	1 to 15.57
60 1-2	119.36	102.57	162.57	1 to 15.58
60 7-16	119.24	102.47	162.47	1 to 15.60
60 9-16	119.48	102.67	162.67	1 to 15.57
60 1-2	119.36	102.57	162.57	1 to 15.58
60 5-16	118.99	102.25	162.25	1 to 15.63
59 1-4	116.90	100.46	160.46	1 to 15.91
58 5-16	115.04	98.86	158.86	1 to 16.17
56 7-8	112.21	96.43	156.43	1 to 16.58
52 13-16	104.19	89.53	149.53	1 to 17.85
7 months)				

During the above period the ratio for the highest monthly average, July, 1859, was 1 to 15.11, at which rate a silver dollar of 412½ grains was equivalent to \$1.05½ gold. The ratio for the lowest monthly average, July, 1876, was 1 to 19.19, at which the dollar was worth 83½ cents. During this latter month there were sales of silver in London at 46½ pence per ounce, British standard, at which price the relative value was 20.17, and the gold value of the old silver dollar 79½ cents.

472 MINES AND MINING WEST OF THE ROCKY MOUNTAINS.

Table for ascertaining the gold value of an ounce of silver, United States standard, from London quotations of an ounce, British standard.

[From the Report of the Director of the Mint.]

One ounce British standard, 925 M.	One ounce United States standard, 900 M.	One ounce British standard, 925 M.	One ounce United States standard, 900 M.	One ounce British standard, 925 M.	One ounce United States standard, 900 M.	One ounce British standard, 925 M.	One ounce United States standard, 900 M.
Pence.	Cents.	Pence.	Cents.	Pence.	Cents.	Pence.	Cents.
45	88.78	49	97.16	53	103.55	57	113.94
45	89.02	49	97.41	53	103.80	57	114.18
45	89.27	49	97.66	53	104.04	58	114.47
45	89.52	49	97.90	53	104.29	58	114.68
45	89.77	49	98.15	54	104.54	58	114.92
45	90.01	49	98.30	54	104.78	58	115.17
45	90.26	50	98.64	54	107.03	58	115.42
45	90.51	50	98.89	54	107.28	58	115.66
46	90.75	50	99.14	54	107.52	58	115.91
46	91.00	50	99.38	54	107.77	58	116.16
46	91.25	50	99.63	54	108.02	59	116.40
46	91.49	50	99.88	54	108.26	59	116.63
46	91.74	50	100.12	55	108.51	59	116.90
46	91.99	50	100.37	55	108.76	59	117.14
46	92.23	51	100.62	55	109.00	59	117.39
46	92.48	51	100.86	55	109.25	59	117.63
47	92.73	51	101.11	55	109.50	59	117.88
47	92.97	51	101.36	55	109.74	59	118.13
47	93.22	51	101.60	55	109.99	60	118.37
47	93.46	51	101.85	55	110.24	60	118.62
47	93.71	51	102.10	56	110.48	60	118.87
47	93.96	51	102.34	56	110.73	60	119.14
47	94.21	52	102.59	56	110.98	60	119.36
47	94.45	52	102.84	56	111.22	60	119.61
48	94.70	52	103.08	56	111.47	60	119.85
48	94.94	52	103.33	56	111.72	60	120.10
48	95.19	52	103.58	56	111.96	61	120.35
48	95.44	52	103.82	56	112.21	61	120.59
48	95.68	52	104.07	57	112.46	61	120.84
48	95.93	52	104.32	57	112.70	61	121.09
48	96.18	53	104.56	57	112.95	61	121.33
48	96.42	53	104.81	57	113.20	61	121.58
49	96.67	53	105.06	57	113.44	61	121.83
49	96.91	53	105.30	57	113.69	61	122.07

General summary of the returns of the mineral produce of the United Kingdom for 1875.

[From the report of Robert Hunt, F. R. S., keeper of mining-records.]

Minerals.	Quantities.	Values.
	<i>Tons. Cwt.</i>	
Coal	131,867,105 0	£46,163,496
Iron-ore	15,221,060 3	5,975,410
Copper-ore	71,528 0	333,414
Tin-ore, (black tin)	13,995 10	735,606
Lead-ore	77,746 4	1,902,148
Zinc-ore	23,978 8	75,110
Iron pyrites	48,035 16	35,136
Arsenic	5,061 5	31,174
Manganese	3,205 11	15,906
Ocher andumber	5,315 12	7,185
Wolfram and tungstate	46 2	382
Plumbago	20 0	None sold.
Fluor-spar	358 18	188
Clays, (porcelain and fire clays)	3,008,444 0	753,957
Oil shales	442,336 0	200,000
Salt	2,316,644 0	1,158,322
Barytes	15,549 5	14,089
Coprolites, &c.	250,122 0	622,000
Sundry minerals, estimated		3,500
Total value of the minerals produced in 1875		57,333,013

Metals obtained from the ores produced in the United Kingdom in 1875.

Minerals.	Quantities.	Values.
..... ounces..	579	£2, 105
..... tons..	6, 365, 402	15, 045, 774
..... do..	4, 322	388, 784
and silver precipitate	54	3, 207
..... do..	9, 614	£66, 266
..... do..	57, 435	1, 250, 373
..... do..	6, 713	162, 790
..... do..	487, 358	115, 247
als, (estimated)		1, 500
al value		18, 476, 746

Value of minerals and metals obtained from the mines, &c., of the United Kingdom in 1875.

value as above	£18, 476, 746
.....	46, 163, 486
s not reduced, earthy, &c	2, 847, 456
total value.....	67, 467, 688

INDEX OF MINES, MILLS, WORKS, ETC.

RE.—This index contains the names of such individual enterprises as are alluded to in the foregoing report. In most cases, the counties in which the mines or works are situated are also given. Reduction-works belonging to mines may be sought under the names of the mines.]

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ANNUAL REPORT OF THE BOARD OF AUDIT FOR THE GOVERNMENT OF THE DISTRICT OF COLUMBIA.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

the final report of the board of audit for the government of the District of Columbia.

APRIL 19, 1876.—Referred to the Committee for the District of Columbia and ordered to be printed.

the Senate and House of Representatives :

I have the honor to transmit herewith to Congress the final report of the board of audit, constituted by section 6 of the act "for the government of the District of Columbia, and for other purposes," approved June 20, 1874, and abolished by joint resolution approved March 14, 1876; and to call your attention to the statements therein presented.

U. S. GRANT.

EXECUTIVE MANSION, April 19, 1876.

TREASURY DEPARTMENT,
April 19, 1876.

THE PRESIDENT:

In submitting a final report of the board of audit, constituted by section 6 of the act of June 20, 1874, "for the government of the District of Columbia, and for other purposes," the undersigned take leave to say that Mr. Carpenter, the Second Comptroller of the United States Treasury, did not become a member of the board of audit until January 1, 1876, and that the board ceased auditing and certifying claims against the District January 31, 1876, in conformity to what appeared to be the prevailing opinion of the Senate at that date, and what subsequently appeared to be the concurrent opinion of the two Houses of Congress.

Prior to the 24th of January, 1876, Mr. Carpenter had no knowledge of the proceedings of the board; and for the few days of subsequent action, that action conformed to the precedent rules of the board, and all that remains to be done is to report the general results which have been reached. To do this we need not state what has already been reported by the board and now constitutes a part of the public records.

The following contains, we believe, a correct statement of the number and amount of claims certified by the board of audit in each class :

		Amount.
Class 1. Number of certificates,	912.....	\$1,035,388 2
Class 2. Number of certificates,	1,955.....	4,390,600 9
Class 3. Number of certificates,	7.....	1,897 0
Class 4. Number of certificates,	2,638.....	7,156,105 7
Class 5. Number of certificates,	655.....	385,869 2
Class 6. Number of certificates,	4,577.....	151,540 8
Class 7. Number of certificates,	2,021.....	827,625 6
Class 8. Number of certificates,	5,639.....	552,884 7
William Bowen,	1.....	1,463 5
Total certificates,	18,405.....	14,503,376 1
Deduct bonds returned and canceled.....		1,900 0
Total amount of certificates.....		14,501,476 1

Of the certificates issued upon audit, as above stated, the following have not been delivered, but remain with the papers turned over to the Commissioners of the District, under the joint resolution of March 14, 1876, viz :

	Amount.
Class 2.....	\$32,281 31
Class 4.....	40,918 37
Class 5.....	2,005 70
Class 6.....	4,817 84
Class 7.....	11,120 09
Class 8.....	1,444 98
Total.....	94,588 27

There have also been audited and allowed, but retained in—

Class 4, various sums, amounting to.....	\$104,810 34
Accounts audited but not certified in class 4, amounting to.....	29,018 92
Claims in class 4, not acted upon, amounting to.....	43,610 57
Claims not acted upon in class 2, amounting to.....	589 29
Claims not acted upon in class 5, amounting to.....	314 00
Claims not acted upon in class 8, amounting to.....	4,938 48
Amount audited but not certified, in class 6.....	113,954 14

297,235 74

This sum being added to the amount audited and certified, makes a total of \$14,800,611.89 as the debt of the District, which has come to the board of audit and which is apparently correct ; not, however, including the former funded debt, nor the cost of work done but not reported by the Commissioners nor engineer of the District to the board of audit, and of which the board have no official knowledge.

The board of audit was constituted by section 6 of the act of Congress approved June 20, 1874, continued indefinitely by joint resolution approved December 21, 1874, and abolished by joint resolution approved March 14, 1876.

On the expiration of thirty days, namely, April 13, 1876, the board of audit, pursuant to the terms of the last-named resolution, turned over all books, papers, and records which had come to their possession, and not then in the custody of the House Committee on the District of Columbia, to the Commissioners of said District, and thereby closed their official connection with the same.

Respectfully submitted.

R. W. TAYLER,
First Comptroller.
C. C. CARPENTER,
Second Comptroller.

A. B. STEINBERGER.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A report from the Secretary of State and accompanying papers.

1876.—Referred to the Committee on Foreign Affairs and ordered to be printed.

House of Representatives :

transmit herewith, in answer to the resolution of the House of Representatives of the 15th March last, a report from the Secretary of State, accompanying papers.

U. S. GRANT.

WASHINGTON, May 1, 1876.

DEPARTMENT OF STATE,
Washington, May 1, 1876.

The Secretary of State has the honor to report that on the 28th of March last he received a copy of a resolution of the House of Representatives in the following words:

Resolved, That the Committee on Foreign Affairs be instructed to inquire into the object and character of the power conferred by the United States upon A. B. Steinberger, special agent or commissioner to the Samoa or Navigator Island; and in the event of this inquiry to call upon the Secretary of State for all correspondence between the said Steinberger and the Department of State touching the object, operation and result of said mission or agency.

The Secretary submits herewith all the correspondence between the Department of State and Mr. Steinberger touching the object, operation, and result of his mission, and in connection therewith submits the following statement, history of the object, the intent, and character of the power conferred upon Mr. Steinberger:

In the year 1872 Commander Meade, of the United States Navy, entered into an agreement with the great chief of the Bay of Pago, of the island of Tutuila, (one of the Navigator's Islands,) by which the latter granted to the United States the exclusive privilege of establishing in said harbor a naval station for the use and convenience of the vessels of the United States Government.

About the same time the attention of this Government was directed by highly respectable commercial persons, to the importance of growing trade and commerce of the United States with the islands of the South Pacific Ocean, and to the opportunities of increasing commercial relations in that quarter of the globe.

The Samoan or Navigator's Islands lie precisely in the track of southern trade; and this fact, taken in connection with their reported good harbors, supposed fertility, and the friendly disposition of their inhabitants manifested toward this Government, led to a desire to secure more reliable information in reference to them. With this object in view Steinberger was, in March, 1873, instructed to proceed to the islands, make a thorough examination in regard to all the points on which it was desirable that the Government should be informed, and report the result of his observations.

In compliance with these instructions he proceeded to the islands, and in due time submitted his report, a copy of which was transmitted to Congress by the President on the 21st of April, 1874, and published by the Senate in Executive Document No. 45, first session of the Forty-third Congress.

In December, 1874, Mr. Steinberger again proceeded to the islands in the capacity of a special agent, to convey to the chiefs a letter from the President, and certain presents, which it was deemed advisable to send them. He has submitted a second report of the result of his observations and the course pursued by him in the islands. After submitting this report Mr. Steinberger resigned his position as special agent of the Government, which resignation was accepted on its being received on the 10th of December last.

In the mean time reports had been received at the Department to the effect that Mr. Steinberger had exceeded the limits of his instructions in various ways; and that, among other things, he had promised to the Samoans the protection of this Government. On the receipt of these reports instructions were at once sent to him, (on 6th May, 1875,) calling his attention to the limited nature of his instructions. In the latter part of 1875 further reports were received from Mr. Foster, the Consul of the United States at Apia, in relation to the course pursued by Mr. Steinberger, and on the 12th of January last it was deemed advisable in order to put an end to all doubt in regard to his status, to address to Mr. Foster an instruction to the effect that Mr. Steinberger's visits to the islands were simply for the purpose of observation and report, and that his mission had no diplomatic or political significance whatever, and that he had never been authorized to pledge the United States the support of any government he might form or assist in forming.

Respectfully submitted.

HAMILTON FISH

To the PRESIDENT.

List of accompanying papers.

1. Mr. Steinberger to the President, August 17, 1872.
2. Mr. Stewart to Mr. Webb, with accompaniment, June 28, 1872.
3. Mr. Steinberger to Mr. Fish, March 14, 1873.
4. Mr. Fish to Mr. Steinberger, March 29, 1873.
5. Mr. Steinberger to the President, June 24, 1873.
6. Mr. Steinberger to Mr. Fish, June 24, 1873.
7. Same to same, December 13, 1873.
8. Same to same, February 9, 1874, with accompaniments
9. Same to same, March 4, 1874.

10. Mr. Fish to Mr. Steinberger, March 4, 1874.
11. Mr. Steinberger to Mr. Fish, March 14, 1874, with an accompaniment.
12. Mr. Steinberger to Mr. Fish, April 8, 1874.
13. Mr. Fish to Mr. Steinberger, April 14, 1874.
14. Mr. Steinberger to Mr. Fish, April 17, 1874, with an accompaniment.
15. Mr. Fish to Mr. Steinberger, April 21, 1874.
16. Mr. Steinberger to Mr. Fish, November 19, 1874.
17. Mr. Fish to Mr. Steinberger, December 11, 1874.
18. Mr. Fish to Mr. Robeson, December 16, 1874.
19. Mr. Robeson to Mr. Fish, December 17, 1874.
20. Mr. Steinberger to Mr. Fish, February 2, 1875.
21. Mr. Fish to Mr. Steinberger, May 6, 1875, with two accompaniments.
22. Mr. Steinberger to Mr. Fish, October 18, 1875.
23. Same to same, (extract,) July 4, 1875.
24. Mr. Steinberger to Mr. Fish, October 28, 1875, with accompaniments.
25. Same to same, October 29, 1875.
26. Mr. Foster to Mr. Hunter, October 3, 1875.
27. Mr. Campbell to Mr. Foster, January 12, 1876.

No. 1.

Mr. Steinberger to the President.

WASHINGTON, August 17, 1872.

I beg to present to your Excellency my sincere thanks for your kindly expressions of last night. Mr. Webb will present full facts relating to the "Navigator's Islands."

In the interests of the Government and yourself, I wish to go thither under the mantle of authority and report personally to yourself, and can only pledge my earnestness and good faith.

I am, your very obedient servant,

A. B. STEINBERGER.

To His Excellency the PRESIDENT OF THE UNITED STATES.

This letter was indorsed as follows :

LONG BRANCH, N. J., August 20, 1872.

Respectfully referred to the Secretary of State. Mr. Webb strongly recommends Mr. Steinberger as a competent person to visit the Navigator's Islands and report upon their condition.

He proposes to serve without pay.

Of course it is not the intention to annex these islands, but if, in your judgment, it would be well to send a commissioner to report upon their condition with a view of sending such information to Congress, you might commission Mr. Steinberger for this duty.

HORACE PORTER,
Secretary.

No. 2.

Mr. Stewart to Mr. Webb.

NEW YORK, June 28, 1872.

DEAR SIR: I beg leave to inclose herewith a petition from the kings and rulers of the Samoan Islands, to His Excellency the President of

the United States, praying that he will annex the islands to this Government.

I shall look upon it as a favor if you will present it to the President upon his return to Washington.

I remain, dear sir, yours truly,

J. B. M. STEWART

W. H. WEBB, Esq.,

54 Exchange Place, New York.

[Inclosure.—Translation.]

APIA, UPOLA, SAMOA

To His Excellency the PRESIDENT OF THE UNITED STATES OF AMERICA :

May blessings from the Almighty rest upon your Excellency; this is our letter to your Excellency.

We, the chiefs and rulers of Samoa, deem it necessary for our future well-being a better establishment of Christianity, free institutions, fellowship of mankind, protection of life and property, and to secure the blessings of liberty and free trade to ourselves and future generations, do petition the President of the United States of America to annex these our islands to the United States of America.

Given under our hands and seals this ninth day of April, in the year of our Lord thousand eight hundred and seventy-two.

I hereby certify that the foregoing is a correct translation of the Samoan petition

G. A. TURNER, M. D. C. M.

APIA, SAMOA, 17th April, 1872.

No. 3.

Mr. Steinberger to Mr. Fish.

WASHINGTON, March 14, 1873. (Received March 17, 1873.)

DEAR SIR: In accordance with your wish, I beg to present in brief my desire as to proposed journey to the South Pacific Ocean.

The Navigators' or Samoa group are situated between latitude 13° 30' and 14° 30' south, and between longitude 168 and 173 west.

The principal islands Tutuila, Savaii, Upolo, and Monua.

Tutuila, the third island in area, is noted for its harbor of Pagopago known to be one of the best in the Pacific Ocean, affording for years refuge for our own and the commerce of other nations.

About one-half of the natives are now Christians, and nowhere has the influence of missionaries been more flattering.

I would hope to be made acquainted with the proposed treaties of the natives, and be instructed to visit this group, examine the more important islands and report upon the same, their advantageous position bearing upon our growing commerce with the British colonies, the character of the natives, the soil, climate, products, and capacity.

Asking for such powers and instructions, with such aid and comfort as the Department may accord to a special commissioner,

I have the honor to be your very obedient servant,

A. B. STEINBERGER.

HON. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 4.

Mr. Fish to Mr. Steinberger.

DEPARTMENT OF STATE

Washington, March 29, 1873.

SIR: It is supposed that the published accounts of the Navigators' or Samoan group of islands, in the South Pacific Ocean, and those which, from time to time, may have been transmitted to this Department by the regular agents of the United States in that quarter, are so scanty that an ample field is there afforded for the observations and reports of an intelligent special agent. You have accordingly been selected as such. You will repair thither in that character, by the route and conveyance which will enable you to reach there in the shortest time. It is supposed that eight months will suffice for your abode in the islands, for the purpose of your mission, including the time of your going and returning.

The points to which you will specially direct your attention are—

1. The number of islands constituting the group, and the extent of each
2. The number of inhabitants, both aboriginal and from abroad.
3. The nature and quantity of the agricultural and other productions.
4. The harbors suitable for vessels engaged in long voyages by sea.

On the 17th of February, 1872, Commander Richard W. Meade, of the Navy, concluded and signed with Oau O Maga, the great chief of the Bay of Pagopago, an agreement granting this Government the privilege of establishing a naval station in the harbor of Pagopago, island of Tutuila. Though Commander Meade had no authority to enter into this agreement, the President thought proper to submit the instrument to the Senate. A copy of the confidential document containing it is herewith communicated in confidence, for your information. It is not unlikely that perhaps in the not distant future the interests of the United States may require not only a naval station in the Samoan group, but a harbor where their steam and other vessels also may freely and securely frequent. Full and accurate information in regard to the islands will be necessary to enable the Government here to determine as to the measures which may be advisable toward obtaining that object.

In the course of your communication with the chiefs in the islands, you will caution them against making grants of their land to individual foreigners.

The European nations, who colonized this hemisphere, have usually regarded such grants from the aborigines as invalid, and in all probability the rule will be held to apply to the Samoan group.

It is expected that you will be specially cautious to avoid conversation, official or otherwise, with any persons respecting the relations between this and any other country. You are to bear in mind that you are not a regular diplomatic agent, formally accredited to another government, but an informal one, of a special and confidential character, appointed for the sole purpose of obtaining full and accurate information in regard to the Navigators' Islands. Even regular diplomatic agents are required to be reticent in regard to the affairs of their own government, and are, by law, forbidden to correspond in regard to the public affairs of any foreign government with any private person, with any newspaper or other periodical, or otherwise than with the proper

officers of the United States. This interdiction will be particularly observed by you.

You will be entitled to the sum of twelve dollars a day from the time of your departure from, until your return to this city, not, however, beyond the first day of December next. This will be in full for your compensation and expenses while employed in this service.

The sum of seven hundred and fifty dollars is now advanced to you on account.

I am, &c.,

HAMILTON FISH

Inclosures.

1. Printed copy of an agreement between the great chief of the island of Tutuila and Commander R. W. Meade, of the United States Navy, dated February 17, 1872,
2. Passport.

[Confidential.]—Executive, L.—Forty-second Congress, second session.

Message from the President of the United States, transmitting an agreement between the great chief of the Island of Tutuila and Commander R. W. Meade, of the United States Navy, conferring upon the Government of the United States the exclusive privilege of establishing a naval station in the dominions of the chief, for the equivalent of protecting those dominions.

MAY 22, 1872.—Read; agreement read the first time, and, together with the message and accompanying documents, ordered to be printed in confidence for the use of the Senate.

To the Senate of the United States :

I transmit to the Senate, for its consideration, an agreement between the great chief of the island of Tutuila, one of the Samoa group in the South Pacific, and Commander R. W. Meade, commanding the United States steamer Narragansett, bearing date the 17th of February last. This instrument proposes to confer upon this Government the exclusive privilege of establishing a naval station in the dominions of the chief for the equivalent of protecting those dominions.

A copy of a letter of the 15th instant, and of its accompaniment, addressed by the Secretary of the Navy to the Secretary of State, descriptive of Tutuila and of other islands of the group, and of a letter in the nature of a protest from a person claiming to be consul of the North German Confederation in that quarter, are also herewith transmitted. No report has yet been received from Commander Meade on the subject. Although he was without special instructions or authority to enter into such agreement, the advantages of the concession which it proposes to make are so great, in view of the advantageous position of Tutuila, especially as a coaling station for steamships between San Francisco and Australia, that I should not hesitate to recommend approval but for the protection on the part of the United States which it seems to imply. With some modification of the obligation of protection which the agreement imports, it is recommended to the favorable consideration of the Senate.

U. S. GRANT

WASHINGTON, May 22, 1872.

Agreement between Maunga, great chief of the Bay of Pagopago, of the island of Tutuila, residing at Pagopago, and the Government of the United States of America, represented by Richard W. Meade, esquire, commander of the United States ship of war Narragansett, now lying at anchor in the harbor of Pagopago, witnesseth :

That I, Maunga, great chief of the Bay of Pagopago, of the island of Tutuila, being desirous for the interest and welfare of myself, my successors, and people, to have friendship and protection of the great Government of the United States of America, do, by virtue of the power vested in me, hereby freely and voluntarily grant to the United States of America, now represented by Richard W. Meade, esquire, commanding the United States ship of war Narragansett, at present lying at anchor in

harbor of Pagopago, the exclusive privilege of establishing, in the said harbor of Pagopago, island of Tutuila, a naval station, for the use and convenience of the vessels of the United States Government. And I hereby further agree that I will not grant a like privilege to any other foreign power or potentate.

Signed and sealed this 17th day of February, A. D. 1872, at Pagopago, island of Tutuila.

OAU O MAGA.
RICHARD W. MEADE,
Commander, United States Navy.

LEONE, *March 26, 1872.*

CHIEF: I beg to remind you by this letter of the land sold by Maae at Fagatoje, and as far as Swimming Point, abreast Goat Island. Maae claimed this land and sold it to a German, and I shall protect this sale. I shall cause an investigation as soon as possible. I could not do so when I came this time to Pagopago in the German ship of war, as Maae could not come with me on account of the war in Upolu, and Maae must be present to defend his claims.

I do request you now not to allow any sale of these lands by other parties, as I shall protect for the present Maae's sale, reserving all German rights and claims.

The fine of \$50, payable on 24th June, or before, imposed for Salauva's assault, you may pay to my agent, Mr. Meredith, at Leone.

I also state, and repeat to you, that the port regulations of Pagopago are not yet legalized, and will not be recognized by me for the present.

I remain, chief, your obedient servant,

TH. WEBER,
Consul of the North German Confederation.

To the CHIEF MAUGA, *Pagopago.*

NAVY DEPARTMENT,
Washington, May 15, 1872.

SIR: I have the honor to submit herewith an additional paper relating to the Navigator Islands, addressed to William H. Webb, esq., under date of September 20, 1871, by E. Wakeman.

Very respectfully, &c.,

GEO. M. ROBESON,
Secretary of the Navy.

HON. HAMILTON FISH,
Secretary of State.

AT SEA, *September 20, 1871.*

DEAR SIR: In pursuance with your instructions, I left Honolulu on July 30, on board the United States steamship Nevada, and proceeded to the Navigator group of islands. On the night of August 8, at 9.30 p. m., I was dropped in a quarter-boat, with one man, off the harbor of Pagopago Island, of Tutuila, without a deviation or detention of five minutes to the steamer. At 1.30, although quite dark, we had arrived at the head of the bay in 6 fathoms of water, and alongside the brig L. P. Foster, she having anchored there the day before. At daylight I found myself in the most perfectly land-locked harbor that exists in the Pacific Ocean. In approaching this harbor from the south, either by night or day, the mariner has unmistakable landmarks to conduct him into port; one on the port hand, a high-peaked, conical mountain, 2,327 feet high; and on the starboard hand, a flat-topped mountain, 1,470 feet in height, which keep sentinel on either hand. These landmarks can never be mistaken by the mariner. The entrance to the harbor is three-quarters of a mile in width between Tower Rock, on the port side, and Breaker Point, on the starboard hand, with soundings of 36 fathoms. A little more than one mile from Breaker Point, on the starboard hand, to Goat Island, on the port hand, we open out the inner harbor, which extends one mile west, at a breadth of 3,000 feet, abreast of Goat Island, to 1,100 feet at the head of the bay, carrying soundings from 18 fathoms to 6 fathoms at the head of the bay; the reefs which skirt the shores are from 300 feet to 500 hundred feet wide—almost awash at low sea. They have at their edge from 4 fathoms to 5, 6, and 8, and deeper in the middle of the harbor. The hills rise abruptly around this bay from 800 to 1,000 feet in height.

They are covered, base to summit, with a luxuriant growth of evergreen foliage, and the little valleys which nestle at their bases, and the narrow belt of land which skirts the shore, are densely covered with cocoa-nut groves, bread-fruit trees, bananas,

oranges, pine-apples, limes, and a variety of tropical plants. The different streams fresh water which pour into the placid waters of this bay, dotted with canoes, some of which are capable of carrying 300 people, complete one of the most interesting features that can be contemplated. The island of Tutuila is 17 miles in length by 5 in breadth. There is nothing to prevent a steamer, night or day, from proceeding to her wharf. About half-way from Breaker Point to Goat Island, and near mid-channel, is Whaler's Rock, with 8 feet of water over it at low sea. It has a circumference of about 50 feet and breaks frequently. A buoy renders this danger harmless. The services of a pilot can never be required by any one who has visited this port before, as the trade-wind from E. S. E. carry a vessel from near Breaker Point, with a free sheet, on a N. N. W. course into the harbor. It follows that vessels under canvas will have to work on the ebb-tide with the trades, will generally be accomplished in a few tacks. The trouble is that a ship close into the reef goes in stays, and frequently the whaler's winds off the highlands baffle her a few points and prevent her taking properly aback; hence, a boat is kept ahead ready to tow her around upon the right tack. Mr. Power, a missionary, has been a resident of this place twenty-two years, and says that he never knew of a longer detention than nine days to any ships in that time, and of but one gale, which came from the eastward and unroofed a wing of his kitchen. Even the trades themselves are frequently liable to haul from E. S. E. to E. N. E., giving a ship a chance to get out with a leading wind.

At the different quarters of the moon the tide rises $4\frac{1}{2}$ feet. The air was 82° and the water 78° during our stay. The passing showers of rain keep the ground moist, and the air cool. There are 400 inhabitants around the shores of the bay, and I think 4,000 in all. A fair estimate of the population of the whole island. About one-quarter of the island is susceptible of cultivation. Two places have been secured in the bay of Pagopago for your ships, the best that could be selected. As the trees, stones and earth are close at hand to fill up with, and are free, nothing but the long piles for the fenders, a plank for the wharf, would be required to be shipped from Puget Sound as a deck-logs with coal below, and a wharf could be easily constructed with every facility at hand. These people are a fine, large, muscular race; perfectly inoffensive, but knowing little of the blessings of labor, as all their wants are supplied. As every man is a land-owner he is perfectly independent, but I have no doubt that in a short time, like the Sandwich Islanders, they would readily apply themselves to habits of industry. In the mean time good labor can be had from the adjacent isles, and a few Sandwich Islanders would soon teach them to work. Chinamen would be invaluable here. The productions of the island are on a soil of dark loam and in spots a reddish-colored loam. The cocoa-nut, from which cohea is made, which is the pulp of the nut sliced and dried three days in the sun, to prevent mildew, grows in this loam. Cohea is worth \$100 per ton in Europe. Bread-fruit, bananas, oranges, limes, sassafras, nutmeg, vinegar-plum, curry, indigo, taro, sweet-potatoes, yams, pine-apples, arrow-root, sugar-cane, cotton, coffee, and a variety of tropical plants, including dye-woods, are found here. Indian corn, also, two crops a year. The stalk is not so tall as in Illinois, but the cob is long, and the kernel as finely developed, and as good as the best. The cotton-tree grows from 10 to 12 feet in height, and 6 inches in diameter. It has large spreading branches and the boll is about the size of an apricot, and breaks in three parts. The cotton is snow-white and a fine staple. About 8 miles from Pagopago, over an easy grade is Cocoanut Valley, which is about 7 miles long by 5 broad. The soil is very rich, producing everything that the tropics can produce. The foliage is so dense that the soil is always damp. Here the largest trees are found, one that is used as a pine; another is like mahogany, from which the pulpits in their churches are made, the bottoms of their canoes, paddles, and steering-oars; cocoa-nut trees and bread-fruit are used for the same purposes, but are more highly prized on account of their fruit. There is a variety of the bread-fruit. Some is as large as the cocoa-nut with the husk on, and some about the size of a nut with the husk off. Bread-fruit is roasted and eaten while hot, when it has the flavor of a sweet-potato. From the bark of the tree most of native clothing is made, and a gum which exudes from the trunk is used as pitch in the seams of their canoes, and is also chewed by the young of both sexes, and appears to be the same tasteless article which is extensively used in all our schools. The nutmeg-tree grows to a height of 30 feet and 12 inches in diameter. The fruit is the veritable nutmeg of commerce, although not much corrugated as the Borneo nut; it is more of an egg shape. There is a plant in this valley, a parasite; almost all the trees are covered with it. The leaf is heart-shaped, about 3 inches long and wide, also pretty thick. The vine is a creeper, as large as the little finger, and grows rapidly. Both leaf and vine is sarsaparilla in taste and to all purposes. A decoction of it is used with the best results in cases of scrofula; it is a great blood-purifier. Two and a half miles from this valley, on an easy grade, is a lagoon, which could, with a little powder used on the reef, be made to receive large schooners. Nobody lives in the valley, and to purchase land quite a number of petty chiefs would have to be consulted. Mango is the largest chief on the island. He lives at the head of Pagopago Bay, and holds his power more from factional causes and

sionary influence than any hereditary title derived from blood or birth. The little island of Anu, to the east of Tutuila, contains 200 inhabitants, and produces considerable copra and cocoa-nut oil. It abounds with bananas, tarra, bread-fruit, and cocoa-nut trees. On its top, an elevation of 600 feet, a site for a light-house has been secured, as it can be seen alike from the north or south, and is right on a line with the ship's course in passing. Being only seven miles from the entrance to Pagopago Bay, or harbor, the ships could pick up the port-lights, and go in immediately to the wharves in the darkest night. There are several fine harbors for schooners on both sides of Tutuila.

UPOLO.

On the 17th of August left Pagopago and ran down before wind and sea on the S. P. Foster for Upolo Island. At 8 p. m. hove to off Fangaloa Bay for the night, seventeen miles to windward of Apia Harbor. On the 18th, at daylight, made sail and stood in for Apia, where we came to anchor at 10 a. m., in six fathoms water, in front of McFarland House. Found the United States sloop of war St. Mary's here. Called on the captain immediately, and learned that he was from Tahiti, and would sail the next day for the Phoenix group, then to the Feejees, and be in Sydney about December. I informed him that there had been a meeting at Baker's Island, and requested him to call and render what services might be required. He said that his instructions were to sight all the islands without communicating; but that, under the circumstances, he would see to them. Called on Mr. Weber and delivered my letters, and found them a Hamburg house of fifteen years' standing. He has two large ships now in port, of 800 tons each; one nearly loaded, and others to follow in a few months. They have also four large schooners—two in port and two absent. They trade among the various islands down on the equator, and bring their cargoes here, where they are received by the large ships and dispatched for Hamburg. Two large ships are now due from his house, and they bring out articles of trade and take back principally copra. These ships, although they remain at Apia from six to nine months, carry home a freight of from \$8 to \$100,000. All the calicoes with which this trade is conducted are manufactured in Manchester, of the cheapest kinds, expressly for this market. His prints sell at twenty and twenty-five cents per yard, and the white from sixteen to eighteen cents per yard. At this group of islands ten cocoa-nuts are purchased for one nigger-head of tobacco; at the islands near the equator fifteen cocoa-nuts can be had for one plug. This island of Upolo is justly called the garden of the Pacific. There is probably no place in the world of equal dimensions which is so well watered at all points, with so many rivers flowing from the interior to the sea on both sides; so many fine large springs of pure cold water boiling up from the earth, and flowing thousands of silent little streams toward the sea. I have had to ford, in passing over three miles of land along the shore, no less than five rivers, many of which contain some of the finest water-powers that could be desired. The soil is generally a dark loam; in some places a reddish loam. The cocoa-nut groves here excel any that I ever saw before, and extend far back from the sea into the mountains. The bread-fruit is also in the greatest abundance, and in the most perfect condition, there being varieties, some very large. Bananas are nowhere found in greater abundance, and of many varieties, all being very fine. The sugar china banana is without exception the most delicious fruit that can be found. Oranges are large in size, and very juicy and fine-flavored. Citrons are very large and fine. Yams are the largest known in the world, and of the best quality. Limes are about the size of a common lemon. The largest mangrove in the world is found here, and just the same flavor as the small ones elsewhere; the manna-apple, arrow-root, sassafras, vinegar-plant, and the to-plant, the leaves of which constitute the whole wardrobe of both sexes. The root of this plant is larger than our California beet, and contains about four times the amount of saccharine matter. Also a great variety of tropical plants, which are very valuable as medicines, trees used for dye-woods, &c. But the great staple article is cotton, which is indigenous to the soil. Some of this cotton sold in Europe last year at eighty-seven cents per pound. When we know that the very best quality of sea-island cotton in the world can be produced here with a profit at one shilling per pound, and a yield of 500 pounds to the acre, it is fair to presume that this is destined to become a very important article of commerce. The tree is from 10 to 12 feet in height, and well filled with pods. Sugar-cane is a weed; it grows wild, and is about 12 feet in height, and filled with juice. The coffee is, like all the above-named articles, indigenous. The bright red bean has always been worn around the necks of the girls as an ornament, which renders them very attractive. The only coffee estate which has been started is on the island of Sawii. In three years the trees grew 7 feet high, and produced fifteen pounds of coffee each, which resembled mocha more than anything else, from its small, round bean or kernel. The French Catholic mission at Apia are about to plant a large coffee estate, and have selected the top of one of the highest mountains in the vicinity. All vegetables are in abundance. String beans two yards in length; peas, and everything in that line; Indian corn, two crops per year. Sweet potatoes not as large as in California, but they

cook mellow and have the same flavor. The tarra, which is the main source of food all the islands, is here in the most prolific, perfect condition. Water-melons, mus melons, squashes, pumpkins, and all kinds of garden vegetables, as radishes, onion lettuce, everything that is put in the ground, here do well. Tobacco is indigenous but has not been cultivated to any extent, although it constitutes the principal article of trade. This island Upolu is about thirty-eight miles long by ten broad, and from the fact that the passing showers of rain visit it, constitutes the most perfect system of irrigation that could be desired. I can see no reason why this island in a few years should not become a Java, a Borneo, a Mauritius, a Ceylon, Cuba, or Barbadoes, and in fact, when a comparison of all the other islands is made with Upolu when more than three-fourths of the island is like a garden-soil, and when we know that not more than a quarter part of all those islands and others which have contributed such immense wealth to the world's commerce, are arable, the future importance of this group may be readily seen. The harbor of Apia is the best on the island of Upolu, although there are many, both on the north side and the south. There were some twelve vessels in port when I was there, a French, Russian, and American man-of-war, and two large merchant-ships, and the rest small craft. The harbor was well filled and the ships rolled their bilges about 5 feet up, and for the first week afterwards it was smoother. They all lay moored head to the trades. During the winter-months from December to April, the trades are broken up and come from the northward, where it is about impossible to get out of this port with a square-rigged vessel. As the southwest comes in from N. N. E. pretty heavily, a vessel must be well found with plenty of ground-tackle to enable her to hold on. She must be anchored close under the reef abreast the American consul's house. But once in 30 years has the wind in this port been rated at a close-reefed breeze; as the winds are never in proportion to the waves it is conclusive, as the records show, that the hurricanes which sweep over the Feejees yearly with such fury traverse to the left hand from N. W. over the Feejees down to 18° or 20° south latitude and revolve round over the Tonga group, and round to the northward of the Samoa group, as these winds have never been experienced, and on a sea from the northward, which tumbles into all ports on the north side of the group which renders it very uncomfortable staying here during these months. At this time at Apia, during these months from December to April, comes in at N. N. E., with a worse sea. After blowing a moderate breeze for 12 hours, it chops round to N. V. blows fresh for about 12 hours, and clears up. A basin could be created at Apia, cutting 1,000 feet through the beach, which is $4\frac{1}{2}$ feet above high-water mark, to a lagoon, where the ships would float in fresh water, protected from all weathers, at a cost of about \$30,000. The air is 85° to 90°; water 80°. I will conclude my limited remarks in regard to the island of Upolu by saying that I know of no other island with the same form of government which all the chiefs are willing and desirous of ceding to the Americans, which would in that event be so valuable. From its commanding position in mid-Pacific, with the control of the commerce of all the islands which are contiguous to this point, with Australia and New Zealand at their door to supply with sugar, coffee, &c., no other group affords equal facility for a naval station as well as a coal-depot for steamers, with a most brilliant future for a most lucrative and extensive commercial enterprise. Of the 150 Europeans, all told, upon this island, they are strongly in favor of having American law established over the islands. Mr. Weber has written some things since to the German government to establish a naval station with a view to a protectorate. I estimate the inhabitants of this island at 10,000.

SAWII.

The great island of Sawii, which is a few miles to the west of Upolu, is 39 miles long and 20 broad. There is about 12 miles in the middle of this island which is, like that about two-thirds of the Sandwich Islands, a burnt cinder, upon which nothing can grow. All the rest of the island is like Upolu, the same soil and climate, with extensive undulating hills and extensive plains; the same products, with the exception that the Irish potato grows on the uplands, which are higher than any of the rest of the group. There is a good trail completely around the island, which contains 10,000 inhabitants in 80 villages. It has no good harbor, but many anchorages in different parts. During the trade-winds it is not so well watered as Upolu, but has abundant springs which, together with the rains, is all that is needed to produce everything in abundance. Two fathoms of calico gives 100 cocoa-nuts. These, cut in slices and dried, weigh 60 or 70 pounds. About 25 per cent. of the oil is lost in drying them, but the loss is made good by the great demand for the white pulp, after the oil is pressed out of it, which is made into all kinds of confectionery. Finally, the refuse of all is made into oil-cake, to fatten cattle. A machine could be sent here which would take out the oil at this point.

ROSE ISLAND.

Rose Island is the eastern of all this group. It is a small, angular coral reef just above water. Mr. Weber bought it for \$100, in trade, some years ago, to plant cocoa-nut trees on it, but they all died, as there was too much guano. It is a great resort for birds, turtle, and fish.

GREAT MAUNA.

Great Mauna precipitously rises from the sea like a dome; the height is 400 feet, precipitously, and then more gently to a height of 2,500 feet. It is 16 miles in circumference, and abounds in cocoa-nut, bread-fruit trees, bananas, tarra, sweet potatoes, yams, and all tropical fruits; also, pigs, fowls, &c.

Fresh water is difficult to obtain; it is also difficult to land on the island, like a very large number of islands in the Pacific. There are very few islands which have good anchorage. The next island, distant 7 miles, is Olosega. It is a narrow ledge of rocks, rising perpendicularly, nearly, from the sea on both sides, and is three miles in length. It has no inhabitants at present. The next island is Opa, a small isle, close to Olosega, and resembling it. Has but few inhabitants; vegetation the same as Mauna. Fifteen tons cocoa-nut oil is made on these islands annually. There are about 500 inhabitants on them. The distance from this group to Tutuila is about 60 miles; no dangers between. The distance between Tutuila and Upolu is 36 miles, free from all dangers. From Upolu to Sawii, about 8 miles; no dangers between. The natives of this group are, no doubt, the finest-looking people in the Pacific, and are certain to be classed among the best-moraled people in the world, as they are all Christians. I shall now close my limited remarks of this group, and, as I have said before, when a fair comparison is made between all the islands which I have mentioned, and others, such as the Sandwich Islands, which certainly contain not more than 1½ arable land, the rest being a burnt cinder, the balance is in favor of these islands.

Scarce a foot of ground upon the whole island of Upolu can be found but what is capable of yielding most abundantly all the products mentioned above, but also many other articles of value, such as medicines and dye-woods. When we add to this island an equal amount of the same kind of land-products on this island of Sawii, and about ½ part of the isle of Tutuila, which is in valleys, and the numerous hill-sides ready to be converted into coffee-estates, with the most perfect system of irrigation in the world, from the passing showers, with a climate and soil unequalled in the tropics; no reefs nor sunken dangers, plenty of good harbors, and the best in the Pacific; no hurricanes or local diseases, inhabitants the most inoffensive, hospitable, and best-looking Christians on the Pacific, the future importance of this group will be readily seen.

E. WAKEMAN.

No. 5.

Mr. Steinberger to the President.

SAN FRANCISCO,

June 24, 1873. (Received July 11.)

To his Excellency the PRESIDENT OF THE UNITED STATES,

Washington, D. C. :

I beg to say that I sail for the Navigators on the day after tomorrow, and will explain delays to Secretary of State. There being no communication, I have been compelled to furnish my own means of conveyance.

As per your instructions, I have this day drawn a draft upon the State Department (disbursing agent) for the remainder of the two thousand (\$2,000) dollars, being twelve hundred and fifty (\$1,250) dollars.

I will present my report in November.

I have the honor to be your very obedient servant,

A. B. STEINBERGER.

No. 6.

Mr. Steinberger to Mr. Fish.

SAN FRANCISCO,

June 24, 1873. (Received July 2.)

SIR: My delay here has been unavoidable. There being no communication with the Navigators, I have been compelled to furnish personal conveyance, but thereby will gain in time and effectiveness.

I leave on the day after to-morrow, (26th,) taking with me a professional artist.

My report will be forthcoming in November.

I have this day drawn a draft upon State Department (disbursement agent) for \$1,250, being balance of the sum mentioned by his Excellency the President.

I have the honor to be your most obedient servant,

A. B. STEINBERGER

Hon. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 7.

Mr. Steinberger to Mr. Fish.

SAN FRANCISCO, CAL.,

December 13, 1873. (Received December 22)

SIR: I have the honor to report return from Samoa.

I ship per railroad to Washington a large collection of curiosities and native productions. My report, with accompanying documents, I will carry with me, on or about the 17th instant.

A severe passage and illness here prevented an earlier report.

I have this day made draft upon the Department for \$900, being within the \$3,000, or \$12 per diem, as per instructions.

I have the honor to be your very obedient servant,

A. B. STEINBERGER,

United States Special Agent

Hon. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 8.

Mr. Steinberger to Mr. Fish.

SAINT LOUIS, February 9, 1874. (Received February 12)

SIR: I have the honor to report that I forward by mail (registered) my report, with accompanying documents.

I have been suffering with an attack of fever, consequent upon exposure, and finished my report among some relatives in Colorado.

At this writing I am not well. May I call your attention to pages 35 and 36, and ask your advice as to final disposition of the bird, now alive and well?

I have to report in Washington in a few days.

I have the honor to be your very obedient servant,

A. B. STEINBERGER,

Special Agent

Hon. HAMILTON FISH,

Secretary of State, Washington, D. C.

REPORT ON SAMOA OR NAVIGATOR'S ISLANDS.*

Mr. Steinberger to Mr. Fish.

AT SEA,

South Latitude 13° 10', Longitude West 168° 20'.

SIR: Pursuant to instructions from the Department of March 29, 1873, I have the honor to report:

That I sailed from San Francisco June 29, on the chartered pilot-boat Fanny, a schooner of forty-three tons, new measurement, for Samoa or Navigator's Islands. The care necessary in selecting a proper vessel for such a journey and its adaptability for the prosecution of my duties when at the islands, and also the adequate fitting out of the same, must be my apology for delay before sailing.

All the measures of prudence employed have been justified by subsequent experience. Besides the crew, I was accompanied only by a practical artist, who also acted as secretary. *En route* I touched at Honolulu, where I learned that the San Francisco newspapers had preceded me. Hence I took immediate occasion to assure His Majesty King Lunalilo that I was in no wise accredited to his government, and that news-vendors in this, as in many other cases, were irresponsible agitators.

Not unmindful of your oral suggestion that I might be "an observer," I accepted an invitation to visit Pearl River Harbor, and, homeward-bound, again touched at Honolulu, and, while awaiting repairs to vessel, availed myself of the opportunity to visit sugar-estates and learn something of the Hawaiian Islands. Such estimates as I have formed of this group have been based upon personal observation uninfluenced by possible surroundings.

The information obtained is subject to a call from the Department for special report.

On the 6th day of August sighted Manua, the easternmost island of the Samoan group, the center of the island being in south latitude 14° 17', west longitude 169° 26'. There being no harbor in Manua, and wishing to reserve an exploration of the island until a later day, I sailed for Tutuila, and, on the 17th day of August, at 8 o'clock a. m., anchored in the harbor of Pagopago, inside of Swimming Point and abreast the village of Faga-to-no, in fourteen fathoms water, about a stone's throw from the beach; south latitude 14° 18', west longitude 170° 40'.

In locating places, I give specific points in harbors or anchorages, which will account for trifling variations from charts, Wilkes being marvelously correct in his astronomical observations and hydrographic surveys of this group.

I shall ignore the term "Navigator's," as the word is unknown to these islanders, they being a people of themselves, with a history, language, and traditions eminently Samoan.

The Samoan group consists of nine inhabited islands, viz: Manua, Oloosinga, Ofoo, Anuu, Tutuila, Upolu, Manono, Apolima, and Savaii. There are four islets stretching beyond the reef upon the eastern end of Upolu: Nuulua, Nutali, Taputapu, and Namoa; also an isolated islet between Manono and Apolima, called Niulapo. Neither of these islets is what is termed a coral-island. Though separated from the larger ones by shoals and coral-reefs, yet they are all of the same formation and physical structure as the main-land. The entire group north and

* This report was originally printed as Senate Executive Document No. 45, first session Forty-third Congress.

south is between $13^{\circ} 27'$ and $14^{\circ} 18'$ south latitude, and extends from $169^{\circ} 28'$ west longitude to $172^{\circ} 48'$ west longitude.

The water-spaces between the islands are free from shoals or outlying reefs, while the island headlands are certain guides to the navigator. Strong currents frequently set through the channels, and, beating windward, especially with square-rigged vessels, lengthen the passage between the islands.

The prevailing winds are southeast trades, which are more uniform than the northeast trades, at times strong, but seldom approaching gale. The entire group is of volcanic formation, but everywhere gives evidence of great antiquity, though in 1866 a great column of fire burst forth from the ocean, between Manua and Oloosinga, and rose like a pillar to the height of a thousand or more feet, continuing for a period of two weeks, and then subsided. And now it is difficult to get soundings over the same place. This is certainly an anomaly in the history of Samoa. Although distinct volcanoes are found upon all the islands yet no account of their eruptions is found in native history or tradition.

The islands seem to have been lifted from the ocean-bed by a mighty convulsion—a subterranean upheaval previous to the earth's crust being broken.

On the island of Upolu I found masses of coral in the water-courses and imbedded in ancient cellular lava at 2,500 feet above sea-level, while marine shells may be found upon the plateaus and mountains throughout the group.

Nowhere upon the island have I found a possible indication of primitive formation or secondary rocks; the entire land-surface plainly showing the immense flow of lava subsequent to upheaval.

On the western shore of the bay of Pagopago, at the base of Mount Maunafu, and also on the coast-line south of Tower Rock, are seen evidences of craters opening through stratified rock. Here I found whinstone dikes and breccia; the trap breccias washed by the ocean are exposed. This agglomeration of minerals is composed of sharp, angular, and frequently rounded fragments; the whole mass iron-stained with percolating water of a chalybeate character, the vesicular lava slightly decomposed.

In the trap formation I have failed to find feldspar or hornblende, the latter giving place to augite, and the entire group being now properly composed of lamella or augitic basalt; the entire absence of alkalies and the zeolite family suggesting a reason for the non-decomposition of the lava as found in the Hawaiian and other volcanic islands in the Pacific.

Red earth, in fields or layers, such as cover large tracts in the Society Islands, is not found in Samoa, except a species of red ocher in small quantities near Lufilufi on the north side of Upolu. This is used by the natives for painting their common cloth, "siapo." The evidence of the most recent volcanoes I found on the north coast of Savaii, between Mount Maunafu and Asau, where the trap breccias are piled up several hundred feet; the northern wall of the crater broken through, and the lava folds stretching down the ravines. Here the seams and folds seem to show recent cooling and are scarcely worn by the elements. The vegetation within the crater is meager and stunted.

In the district Aana, western portion of Upolu, is the mountain Sufua, an extinct volcano 2,500 feet high. The crater is about 600 feet deep; the circular rim of the cone perfect in its uniformity; the inner walls gently sloping and lined with vegetation; the floor about 30 acres, level, and covered with a magnificent growth of timber, in fact a forest of stately trees.

Upon the southeast point of Savaii is a headland 700 feet high, called by the natives Aganoa. This, also, is an extinct crater, the inner walls nearly perpendicular; the descent for 700 feet is over ragged and jutting masses of lava, and is extremely difficult; beyond this and far below the ocean's level the walls are a sheer descent. I regret that I had not the appliances for further explorations.

The highest mountains in each of the islands are conical or spire-shaped. Where all evidences of craters have been destroyed by time and the action of the elements, upon such mountains are found ancient vesicular lava and amygdaloids, the olivine often disintegrated and found in the water-courses. Lava, in stratification or folds, is generally distributed over the islands, often presenting a granular appearance.

At Apia I was told of an ancient work built of "cut stone" about one day's journey in the mountains. I visited it with native guides, and found stone pillars and slabs for flooring, the whole forming a circle. The uniformity in the size of the stones, and their smoothness, certainly looked like the stone-cutter's work. These ruins were in a dense forest with a heavy growth of underbrush. Penetrating this, I found under an overhanging cliff a quarry of laminated lava, granular in appearance and of fine texture. This discovery furnished an immediate solution of the "cut-stone" problem. But by whom and when this structure was erected, and for what purposes, whether this island ever had an age analogous to that of the Druids, or that of Central Mexico at the time of the Spanish conquest, I leave to the conjecture of others, since the inhabitants have no traces of history or tradition which throw any light on the subject.

The line of the mountains follows the general course of the islands, *i. e.*, from east to west, the south side generally precipitous, forming a rough and broken sea-front with few harbors or secure anchorages upon the south or weather side of the islands, though there are indentations in the coast-line where the inner waters are protected by a coral-reef stretching across the opening, such as Satupaitea on Savaii, and Faliolili on Upolu. With such exceptions the south coast is "iron-bound," the lava forming a level and naked plateau between the hills and the sea.

Here the great swell of the ocean breaks continually with deafening roar. These lava sea-walls are from 20 to 50 feet above the sea-level, pierced in many places by caverns at the water-line, or beneath, having vertical openings upon the lava-fields. Through these caverns the waters rush, and forcing their way through the inner perpendicular opening, form a magnificent *jet d'eau*. When the southeast winds blow strong and the ocean is heaving, the water-columns may be seen at a great distance from the land.

This description of the south side of the mountain-chain applies equally well to the north side of the island of Tutuila. Excepting about one-third of the island, west end, the mountains rise precipitously from the ocean upon either side, to a height of from 1,200 to 2,327 feet, height of Matafn, the tops pointed and the sides indurated and scarred.

Upon Upolu and Savaii, after leaving the broken summits of the mountain-chain, the northern descent is gradual to the ocean, forming great plateaus, long stretches of gentle slopes, and broad valleys.

Associated with the geological structure of these islands are the caves of Savaii. They seem hitherto to have attracted no attention, not even the missionaries having visited them. I entered one through a well-like opening, upon the level ground back of the village of Saleaula. This opening was caused by the arch of the cave breaking, the *débris* being

piled upon the floor. The roof is a perfect arch, and quite as symmetrical as the finest railway-tunnel.

Traversing this cave a distance of about a mile and a half toward the sea, I came to a cross-section, or passage, running at right angles, the same size and physical structure. This opening I followed nearly a mile, finding a uniform level, with good air. I returned to the main cave, and followed it perhaps half a mile, when it branched; continuing to the right another half mile I found the roof broken and further progress checked, but discovered a small opening upward, sufficiently large for egress. I did not determine the full extent of these subterranean passages. I would not estimate the floor to be more than 20 feet above the level of the ocean, while the roof is scarcely more than 10 feet in thickness. This arterial system of caves is beneath a wide and level stretch of country very heavily timbered. I incline to the belief that they are connected with the ocean, as in some places upon the floor the water was quite salt. Like subterranean channels, no doubt, account for the fresh-water springs upon the beach in many places. In the bay of Sataipaitai is a great spring of fresh water, 50 feet from low-water mark, which boils like a huge caldron from the rocks beneath. Here the natives bathe in fresh water, though surrounded by the brine of the ocean.

In the small island of Anuu is a mud lake, likewise connected with the ocean, as it rises and falls regularly with the ocean-tides. A more interesting field is here opened for the researches of the geologist. A still more remarkable phenomenon is presented upon Quiros Island, northeast of Savaii two hundred and thirty miles, a reef-island or atoll, the circular reef low, scarce high enough to resist the waves during a northern gale. This reef surrounds a lagoon of fresh water, in which small vessels might anchor. It seems reasonable that the water-sheds of Samoa, by subterranean passages, supply this lagoon with fresh water; hence I have alluded to it. The southern or windward sides of the islands are rock-bound, and without coral-reefs, except in the coves and such places as I shall refer to in detailed description of each island.

On no part of Manua, Anuu, or Tutuila are the coral-reefs extensive, while the whole northern coast of the larger islands of Upolu and Savaii have a sea-barrier of coral, at many points stretching two miles into the ocean, usually shelving downward toward the land, leaving inside water-courses, which channels are navigated by the native crafts, giving them easy and facile communication between the villages. The outer edge of the reef at low tide is often exposed; seldom perpendicular, usually inclining inward. Upon this reef the waves roll, and, breaking, comb over in successive cascades.

The island of Manono, off the western end of Upolu, and distant two miles, is entirely surrounded by a coral reef. These reefs have many passages or breaches opening into the bays. Many of these breaks are only boat-passages, while some are larger channels, such as make the entrance to Apia and Fagaloa harbors in Upolu.

The warm and equable climate, the moisture of the atmosphere joined to a vigorous and prolific soil, have clothed these islands with varied and luxuriant vegetation.

Leaving the naked, scarred, and burned mountains of Hawaii and approaching the Samoan Islands, the contrast is certainly cheering. Eternal summer gives to the latter a perennial flora. From base to mountain-top is covered with verdure. Excepting the shore-line of lava before mentioned, and a lava-field of a few miles in area on the eastern end of Savaii, there is no space of bare or naked land in the entire

The soil is a rich mold upon the slopes, and even upon the pre-mountain-sides, while the valleys and level tracts are a deep deposit of the same, the whole a decomposition of vegetable matter with only a slight proportion of decomposed lava; this being imbricated with iron, makes a vigorous tillable loam. So rapid is the decay and decay of vegetable matter, and so long has it been accumulated that the interstices of broken lava upon abrupt declivities are covered with soil, which is again protected from heavy washes by trees and fernery.

On a near approach to the islands the groves of cocoa-nut trees are lining the beach, with native villages nestling among them. The ground of abrupt hills or long easy slopes is covered with a heavy growth of timber. Perhaps no islands in the Pacific have such primeval forests, and such a variety of valuable woods—tall and symmetrical trees with clear and uniform stems seldom found in groves of hard-wooded heavy timber-trees with umbrageous foliage, and groves of softer, but more perishable trees.

Tamanu, (*Callophyllum inophyllum*), so often described by visitors to Tahiti, is a native also of Samoa. It is found upon all the islands of the group, but is most abundant upon the higher slopes of Upolu and Savaii. It is a heavy tree, with spreading branches, the trunk often 4 feet in diameter, the trees seldom growing together.

Fetau is perhaps the most valuable timber-tree in the group, not so large in the trunk as the *Tamanu*, but taller, much more abundant and accessible, the wood being of various shades of red, of fine texture, and enduring polish. The *Fau* (*Hibiscus tiliaceus*) is common to most islands of the Pacific; here it is very abundant, and more valuable to the natives than any other tree, except, perhaps, the cocoa-nut and bread-fruit.

The wood is much used for canoes, but its value is in its fibrous bark, from which fishing-nets and fine lines are made, also a beautiful white mat with a soft nap, 6 or 7 inches in length, much resembling a fine dressed sheep-skin. The tensile strength of this fiber is greater than that of silk or hemp.

The *ao*, banyan-tree, (*Ficus indica*), is too well known to need a description here. It is not abundant in Samoa, though perhaps as much so in the Indies, considering the area of the islands; here it is the monarch of the forest, lifting its great leafy dome above the surrounding foliage. It may be seen from the coast, miles in the interior.

The *ifi*, native chestnut, and the *vi* are both large trees, growing in abundance, taking second rank among the Samoan trees. Both are bearing. The *vi*, known in Tahiti as the Brazilian plum, bears once a year. The fruit, when ripe, is of a rich orange-color, as large as the largest peach. It is very nutritious, and in taste more nearly approaches the apple than does any other tropical fruit. The *ifi*, or bread-nut, is particularly attractive from its graceful stem and buttresses, which grow out from the trunk at the base. These remarkable buttresses surround the tree in perfect regularity, having very thin bark, and are sometimes six or eight feet high, gradually tapering from the top to the earth.

The accompanying document marked "M" is a memorandum of the principles of this group. They are numbered to correspond with pieces of sections of the trees which I have had carefully prepared and numbered. The list is by no means complete, but accurate, as I have personally inspected each tree from which the samples were taken. With greater craft, I would have brought to the United States a section from the trunk of each.

The *ua*, Chinese paper mulberry, is common to all the islands of the Pacific, very abundant in Samoa, so much so that the osiers or twigs are seldom regularly cultivated. The miniature thickets are found all the lowlands. From the inner bark of the *ua* is manufactured native cloth, the "*tapa*" of most groups, "*siapo*" of Samoa.

The *paoga* and *tala* are two varieties of *pandanus*, small, fibrous trees from which the native coarse and finer sleeping-mats are made.

The *ulu*, bread-fruit tree, (*Artocarpus*), here flourishes in greatest variety and luxuriance. In every village they are interspersed with cocoa-nut, and surround each house, while every town has one or more groves in the interior. On the leeward end of Savaii, one can walk a mile or more at a time through *ulu* groves. The tree is not tall, uniform and beautiful in shape, with wide-spreading branches and bipinnated leaves, the entire foliage charming in its regularity. The fruit is the staple article of food in Samoa. The heart of the tree is of a dusky-red color, strong, straight, and easily worked. From it the frames of the native houses are made, and, excepting for boat-building, it furnishes the lumber of the natives.

The cocoa-nut, (*Cocos nucifera*), in Samoan *nui*, needs no description. Its wide range of usefulness cannot be exaggerated; its almost incalculable value to the tropical islander of the Pacific is at once appreciated by a stranger among them. Upon the low coral islands it is food, drink, and clothing. In Samoa, besides being an article of export, of which I shall treat more in detail hereafter, it enters more or less into every branch of the primitive industry of the nation. From the husk of the nut sennit is plaited, with which their large canoes are sewed together (in lieu of nails,) sheets, hawsers, and all cordage made, and the entire frame-work of houses, great and small, fastened with it; the large shells in pairs, used for water-vessels, which may be seen hanging upon the post of every house; the water of the green nut drunk as a beverage, and often supplying the place of spring-water in some districts; broken shells used for fuel, and the dried leaves of the tree as torches for night-fishing or land-traveling. The wood, however, is soft and decays quickly, except the heart, which is very small and was formerly used for spears; it is hard, exceedingly rough, and is said to be very poisonous. In times of war the trees are cut and used as barricades for war-canoes, and parapets to forts. The cocoa-nut generally grows on the beach, its roots often in the salt water, though extensive groves stretch far inland. In the smaller islands, where it feels the influence of the salt atmosphere, it grows high on the mountains and is found on Tutuila at a height of 1,500 feet. The tree, grown from the nut, bears in five, and attains full growth in seven years; the product is from five to one hundred nuts to each tree. So extensive and unfailing is the growth of the nut-tree that it would be difficult to even approximate what might be the aggregate annual product of the islands.

The *anauli*, a tree of excellent hard wood, is a vegetable caustic, less positive in its action than nitrate of silver; its properties are well known to the natives, and fully attested by resident missionaries. I have samples among growing plants which I hope to preserve.

Ava (*Macropipum methysticum*) is a spreading shrub, growing in clumps from 6 to 10 feet in height. The stalks are deep green, in joints like bamboo or sugar-cane. The plant grows from a large bulbous root. In late years the medicinal properties of the *ava* have come to be appreciated. It is a harmless and delightful soporific, properly administered. In most of the islands of the Pacific it is used as an intoxicating beverage, though in Samoa it is drunk only on special occasions—councils

taining of friends; generally tendered as an evidence of esteem. It is not seen or known of a case of intoxication or stupefaction from its use in the islands. The liquor is prepared from the dried root by a long and tedious process of mastication by young girls, and strained through coconut fibers into a large bowl hewn from the trunk of a tree, the side of which, from constant use, attains a beautiful pigeon-blue or enamel of high polish. The plant grows wild, though it is extensively cultivated in many places.

The native odoriferous shrubs and flowers of Samoa would not take rank in botany either for multitude or variety, yet there are few who pay greater tribute to floral nature than the Samoans. The scent-bearing plant and fragrant flower is brought into requisition for wreaths, necklaces, and other adornments of the person. Native hair is scented with *ififi filofiloa*, *afia oliin*, and other odorous plants and flowers; while necklaces are made from *taitaipo*, *pupuiono*, and the fruit of the *oli tato*. These are some of the numerous flowering plants having no technical names.

Amapapa and *Laufassafasa* are names of climbing ferns. Often evergreen ferns climb to the tops of the highest trees, their rich tassels pendant from the overhanging boughs, making a delightful wood picture. I have been particularly impressed by the abundance and great variety of ferns in the mountains. The dye-stuffs known and used by the natives are *nuagu*, red ocher, yellow of tumeric, a lamp-black prepared from the candlenut, and a solution of the scraped bark of the *oa* tree.

The existence of other and valuable dye-stuffs in a country so prolific of precious woods cannot be doubted, the simple wants of the natives requiring no stimulus in that direction.

Fruit and vegetables are limited in variety, this fact is amply compensated for by their abundance. So bounteous is nature, that every day is practically to the Samoan a holiday. The production of food and the support of a family can scarcely be termed labor, yet few aboriginal people live better. Bread-fruit hangs invitingly about every house; it is the chiefest article of food. There are several varieties, and from them dishes are prepared. The fruit is mostly baked in ovens and eaten with fish, yams, taro, and bananas. The statement, however, should be withheld that the bread-fruit is not a nutritive food. The natives, though devoted to it, feel sensibly that the constant use of it is enervating to mind and body. But the ease with which it is produced, and the consequent exemption from much hard labor which it secures, induce them disinclined to substitute for it the maize of the temperate zone, though Indian corn grows here in great luxuriance and is known by the natives to be more conducive to the development of mental and physical vigor than their favorite bread-fruit. There are eight distinct varieties of the yam, (*Dioscoria alata*), the Samoan *ufi*. It is indigenous, growing in the woods and high upon the mountains, where it attains its greatest size; sometimes a single cluster of roots weighing eighty pounds. However, the cultivated yam upon which the natives rely. Every family has its yam and taro patch. This vegetable is a poor substitute for the potato, possessing but little more than one-half the nutritive qualities of the latter; but the ease of cultivation and the certainty of crop make it common food for both foreigners and natives.

Taro, taro, arum, is also indigenous, and of many varieties. In the Hawaiian Islands, where it is the staple article of food, it is raised in places flooded with water; its cultivation is attended with hardships, and some years the crop is precarious. In Samoa the dry taro (*Arum*

costatum) flourishes best. It is a rich, nutritious, and healthful food; growth and appearance not unlike the potato, but far more valuable as a vegetable food, containing as it does a large proportion of starch. Taro is highly esteemed by the whites, and no doubt will ever be the staple food on the islands. Very unlike the potato and the yam, it cannot be transported, as it is subject to decay in a few days. From the young green tops of the taro the natives make a variety of very palatable dishes.

Masoa (arrow-root) is indigenous; it is found wild, but seldom cultivated and rarely used. Great quantities might be raised by a little effort.

The common white or Irish potato has not proved a success. It grows strong and rapidly, but loses flavor. The seed runs out, or the tubers turn to the sweet-potato. Upon the mountains or high plateau, I have no doubt the potato would flourish quite as well as it does in Hawaii.

The sweet-potato is large, the crop certain, and the yield very good, but it lacks the richness and flavor of the same vegetable in our Southern States.

The plantain and the banana grow upon all the islands in great profusion and variety. I have heard many native names for these fruits, but yet, upon investigation, found that they were the names of separate varieties, with very marked differences in the size, shape, and flavor, and also a difference in the size and character of the tree. In some districts there are regularly cultivated banana plantations. The wild banana is especially valuable for its fiber, much resembling hemp in texture.

Oranges, lemons, and limes are very abundant, the latter in great variety and excellence.

Guavas, mangoes, and citrons are found in plenty. The citron is justly praised for its beauty, its dark-green foliage shading the fruit, which hangs like great corrugated masses of gold.

Filimatu and fagaio are native fruits not worthy of especial attention.

The wild tumeric is very generally distributed. It is used chiefly as a dye-stuff by the natives. The curry made from it is a very superior article, comparing favorably with the finest curry of the Indies.

Coffee is found wild, though not in sufficient quantities to ever justify the belief that it is a native of Samoa. The tree is of fair size, but the berry is small. No effort has been made to cultivate it, though the high land is particularly favorable to its culture. Climate, soil, especially the favorable topography of the country, unite to invite such an industry.

Indigo grows profusely; the stem is fine, and the whole plant rich in coloring-matter. It is not cultivated.

The atone (nutmeg) is indigenous. There are several varieties, but those most common are worthless. I have seen but one variety, that upon Savaii, which possessed the value of the Indian nutmeg; on this tree is sparsely scattered over the island.

The mace is exceedingly fine and rich, the nut larger, but below average flavor of the nut of commerce. Cultivation, no doubt, would improve it.

There are two varieties of cotton growing on the island; both species of sea-island cotton, one of much larger fiber than the other. It is known by whom nor when it was first introduced; it is not cultivated, growing as a weed, but in very limited quantities, upon the small island of Aua. Southwest of Tutuila, I saw, perhaps, thirty acres in bloom. It is picked only when there is an opportunity to barter with a trader visiting the island. A very little is picked in the vicinity of Apia, on Upolu, and

in Savaii. The cotton is certainly of a fine quality, and not subject to cotton-worm or insects. There are large tracts of country upon the islands eminently adapted to the cultivation of cotton and indigo. The fauna of the islands little can be said. The Samoan language has a common term for beasts and birds—*mauu*—which is a general term for special names of birds.

Few wild dogs are found in the mountains. The dog, though wild, differs from the appearance or habits of the wolf or fox, and has evidently been introduced from the domestic animal brought by shipping to the islands.

The pig (*puao*) is common to all the larger islands of the Pacific, and is abundant in Samoa; numbers are seen in every village; they and fowls comprise the animal food of the natives.

Wild hogs roam in herds through the forests. The researches of the naturalists, with the abundant testimony from history and tradition of the islands, seem to prove that both the pig and common fowl are native to the Pacific islands. The natives point with certainty to the existence of the pig beyond the time of La Pérouse and Captain Cook, though it has generally been accepted that the pigs and fowl left by the latter were original introduction.

The chicken or common barn-yard fowl—*tamai moi*—is quite as abundant in civilized and thickly-settled countries. The same bird is also found in the forests in great numbers. While the field for the ornithologist would not be extensive, yet he would be amply compensated for this by the peculiar habits and rare plumage of native birds.

The species unknown elsewhere, the dodo, (*Diduaculus strigostoris*), are properly, the "little dodo," the *Manumea* of Samoa, long supposed to be extinct, is found only in this group. It is a timid bird, of lonely habits, exceedingly scarce in number, and only found in lonely and inaccessible parts of the mountains. The dodo was once considered sacred by the Samoans; at another time used as food for great numbers.

It is the "tooth-billed pigeon," having three teeth upon either side of the lower mandible. I have brought a living specimen at considerable labor, care, and expense, the only caged bird upon the islands; also, a perfect specimen preserved in spirits, a subject for the taxidermist.

About two centuries past the few remains of this bird known to the scientific world, as a foot or a head, together with some paintings made in the seventeenth century, have been preserved in European museums with great care, and have been regarded as of great value. Several scientific treatises upon it have been contributed to learned societies in the last fifty years, but so little has been known of it by naturalists that they have not been agreed as to what family it belonged to, or what were its habits.

Ornithologists will doubtless recognize in these specimens an extremely valuable acquisition to science, and improve the opportunity now afforded of making a thorough acquaintance with its peculiarities, and of determining its proper classification.

I feel a personal gratification in the fact that the United States will share the honor of restoring this rare and remarkable bird to the attention of the scientists of the world, and will have this new opportunity of increasing its interest in the promotion of scientific knowledge.

Manuma and *Manutago* are two varieties of cooing doves, of green, blue, and golden plumage, with scarlet crests.

The native pigeon, (*lupi*), a trifle larger than our tame species, is very abundant. Many are tamed and carried upon sticks by native chiefs.

The kingfisher is a small bird, of exceedingly beautiful plumage.

The vampire bat, *péa*, flying fox, (*Pteropus ruficollis*), identical in ap-

pearance with the *Pteropus Edwardii* of Madagascar, is very abundant once considered sacred, and entered very largely into the structure of their reverential religion. It attains great size, often measuring 4 ft from tip to tip of wings. It is neither carnivorous nor insectivorous feeding, as it does, exclusively upon fruits. I have brought two specimens with me, and have had abundant opportunity to determine this statement, notwithstanding the generally received opinions of naturalists to the contrary.

Water-fowl are scarcely worthy of mention. A few are found in the water-courses of eastern Savaii.

There are no poisonous reptiles in the Samoan group, but there is a considerable variety of harmless snakes upon the islands of Savaii, white, red, green, black, and spotted. I saw the first reptiles in the islands at the village of Asou, in Savaii, and there learned of the "crowing snake," (*Vivimi gata*.) It is the subject of native songs. The testimony of both whites and natives points directly to the fact that they have a snake which *crows like a cock*. I did not see or hear one. The apparent physical impossibility of such an anomaly made me skeptical, but the unequivocal testimony of the missionaries to the existence of such a reptile seems too strong to be rejected.

It has long been supposed that snakes were not found in the Polynesian Islands; that they belonged only to continents or islands contiguous to continents. Certainly, they are not found upon any island of the Pacific north of the British colonies, excepting Savaii.

A conchologist associated with me would have had a most inviting field for study. The beaches, reefs, and estuaries of Samoa abound with beautiful shells and shell-fish of numerous varieties. The curious nautilus which sport among the coral present an almost endless variety of gorgeous hues, some of them possessing a metallic luster of marvelous richness, altogether affording a most amusing study.

Fishes used as food are also very abundant, though the variety is meager. They are the varieties common to southern seas, dolphin, bonito, and mullet being most abundant, the latter taken in the bays and lagoons in great quantities. Bonito-fishing is an amusement as well as an industry. Every prominent family owns its bonito-fishing canoe (*vaaalo*.) The fish are taken in rough seas beyond the reefs, and the employment gives fair opportunity for the exercise of great skill in the management of their boats by the fishermen.

The climate of the Samoan group presents striking differences from most, if not all, the islands of the same latitude in the Pacific Ocean. After exertion its debilitating effect is plainly apparent to a foreigner; a mental and physical prostration, no premonitions of which are felt, however, while in action, excepting when protracted to an unusual extent.

A careful reading of the thermometer during four months in various parts of the islands at sea-level, night and day, gives a mean temperature of 80.60. This is a higher range of the mercury than more prolonged readings would show. The following, taken from the reading of Rev. J. Whitmee, at Malua, Upolu, for 1872, is perhaps a fair estimate.

Highest reading in shade, December 17, at noon, 87; at noon, December 18 and 19, 86; October 30, November 5, December 16 and 17, 85; July 21, at 6 o'clock a. m., 70; July 23, at 6 o'clock a. m., 71; May 28, June 5, August 9 and 10, and December 10, 72; mean temperature during 1872, 78.33. On the 11th day of August, in the harbor of Pago Pago, from 11 a. m. to 3 p. m., in the shade without wind, the thermometer stood at sea-level 88.70.

an altitude of 300 feet, 88; at an altitude of 1,000 feet, 86; at an altitude of 1,500 feet, 84; at an altitude of 1,750 feet, 81; temperature in the bay, 87. The same relative thermometrical changes of temperature are found upon the higher mountains of Upolu and Savaii, the lower temperature upon the southern or weather side of the mountains, the atmosphere being tempered by the prevailing south-winds.

Clouds are evenly distributed throughout the year, excepting the months of January, February, and March, when northern winds and storms often sweep over the islands.

Constructive storms are of rare occurrence. Hurricanes such as rush from the Feejees to the southwest and the Society Islands to the east are almost unknown. The uniformity of the trade-winds and the vast expanse of ocean surrounding the islands seem to insure the group against sudden climatic changes.

A striking peculiarity of the climate is found in the fact that the difference of temperature between the sun and shade is seldom more than 2°. Repeated observations made with a cloudless sky and vertical thermometer showed 82° in the shade and 89° in the sun. At no time have I observed a greater difference between sun and shade than 10°, while the average has been 7°.

The equability of climate renders one extremely sensitive to even small changes in the temperature; 82° at 9 o'clock p. m. may be comfortable, while a fall of 3°, 79° at midnight, makes blankets desirable. I esteem to be significant facts, having no little bearing upon the general health of the inhabitants, and a fitting subject for scientific investigation.

The Samoans are not exempt from diseases, being afflicted with spinal diseases, diseases of the skin, eyes, and the lungs, with elephantiasis, and so on, to a great extent. Diseases of the spine are far less prevalent than in the neighboring groups, most common in infancy, and resulting in curvature of the spine; but the hunchback, when grown, is usually vigorous and healthy. Such cases are rarely, if ever, meningitic, the brain not being affected. The skin-disease, *Samoan ilamea*, has the appearance of scoriasis, most prevalent among children, which they outgrow. Children's living in a state of nudity and playing in the hot sands of the sea-coast seems to suggest a reason for such afflictions. I have found but few cases of ophthalmia proper. In afflictions of the eye the pupil is not diseased, and sight seldom impaired or destroyed, though there are many cases where the eyelids are badly inflamed and the membranes of the eye inflamed.

Living in salt water and continual exposure to the sun's rays upon the white sands of the beach, in some districts, is the primary cause of the general prevalence of sore eyes. Having in mind the statement of Theodore Wilkes, in 1839, that "one-fifth of the population of Savaii were afflicted with ophthalmia, and very many blind," I sought every opportunity of determining the accuracy of the statement. I visited the village in Savaii, and met the greater proportion of the natives. On this island I saw but three cases of total blindness, and a less proportion of eye-diseases than exists in our large cities. This estimate will apply to the whole group, with the single exception of Manua, easternmost island, where about one-twentieth of the population have diseased eyes, and quite a number are blind. From careful inquiry, however, I am satisfied that diseases of the eye were far more numerous in the past than they are in the present generation. So far as I know, I saw no cases of amaurosis. I found the whites entirely exempt from such

affections. Lung-complaints among the natives are a prevailing malady arising probably from continual exposure and a want of knowledge of the proper remedies in the incipency of the disease.

Laryngeal, bronchial, or tubercular consumption is very rare. I do not see a case of phthisis pulmonalis. Affections of the lungs are from sudden colds, often inducing pleurisy or pneumonia; and usually rapid and exhausting is the attack that only the most vigorous constitution survives it. In such, as well as rheumatic attacks, the natives resort to *lumi lumi*, a system of pounding and kneading the body, which is at times very efficacious.

Venereal diseases are almost unknown; it would be almost impossible to conceal a case should it exist. Aware of the prevalence of loathsome diseases among aboriginal people generally, I was astonished to find an almost entire immunity from such maladies upon the part of the Samoans. I saw one case, female, on Savaii, a Samoan, but recently from Tonga. This single case was an object of the attention and deep indignation of the natives in the surrounding country.

Leprosy is not known in the Samoan group, *not a single case existing*.

Elephantiasis is the scourge of the South Seas. There is scarcely a village in Samoa which has not one or more cases. The disease is usually heralded by an attack of chills and fever, and rapidly develops itself, seeming to defy medical skill. The limb soon swells to an enormous size, though the general health does not seem to be seriously impaired; and the victim of this malady moves about without seeming discomfort. Not unfrequently the testicles are attacked, and often become frightful tumors. I have seen cases operated upon where the extirpated tumor weighed seventy-seven pounds. Dr. George A. Turner, at Apia, of the London Missionary Society, has operated upon many cases without losing a single one, usually saving one testicle. In many cases the average weight of the tumor was twenty-two pounds. Exposure and constant life in the water are among the causes assigned for the general prevalence of elephantiasis. But it is not restricted to the natives. Whites long resident in the islands are likewise subject to it. In late years surgeons in the British navy have given earnest and commendable attention to this disease.

The natives have rude and primitive ideas of surgery. A broken back, when the spinal cord is not severed, is quickly, and often effectively, treated as a broken arm or leg would be. Trepanning is unknown among them, and often practiced; also phlebotomy. Where knowledge of the science of medicine and surgery, as known and practiced among enlightened nations, shall become diffused among the islanders, I doubt not that the diseases which are now destructive to them will become as amenable to treatment as they are in our country.

The natives of the South Sea Islands are generally regarded as a Malay or Papuan—the latter the Polynesian negro, intensified in New Guinea and Australia, and modified in the Feejees; while the broad face, heavy features, and dark skin of the Hawaiian speak of Papuan admixture.

The Maori of New Zealand, the Tahitian, the Tongese, and Samoan are the Polynesian Malay, the latter a fairer physical and mental type of manhood than the Asiatic Malay of to-day. Never subject to the vicissitudes of other races, and consequent admixture, uncorrupted and unchanged, they have preserved many of their original characteristics. The face has many of the distinctive marks of the European. Generally the profile is decided and the facial angle distinct, the occiput broad.

seldom elevated. Unlike the Malay, the nose is never artificially altered, deformity of person never having been practiced among them. The nose is usually straight, but not so delicate in structure as that of the whites; the mouth large, and lips thicker than those of the Europeans. The profile of the young girls is often very pronounced; the hair soft, and sometimes fine and wavy—never crisp and curly in either sex. Among the men beards are not so general as among the whites; many have luxuriant beards. The eye is black, soft, and pleasing, giving that melancholy air and “meekness” of expression which Hummel says is characteristic of the islanders of the Pacific. The skin is olive, resembling polished copper, presenting no difference in the complexion, though the prominent chiefs and better families are much lighter, and of smoother skin. They are also taller and more symmetrical in person than the common people. The infant is much lighter in complexion than the adult. The male Samoan is tall, erect, and proud in bearing, with straight, and well-rounded limbs, the contour of person seldom exhibiting muscular protuberance or development. The females are usually slight, especially the young girls; erect and symmetrical, easy and graceful in their movements, the charm of light-heartedness seems to follow every action.

Beauty of feature is not the rule, though many of the village maids are exceedingly beautiful. The Samoan does not incline to obesity, selecting his erect bearing and roundness of limb and figure. The “Na,” of the Malietoa family, mentioned by Commodore Wilkes as when a young girl, is now, at the age of fifty, a beautiful woman. Though internecine war has often desolated the islands, and the jealousy of districts, chiefs, and families is great, yet the Samoans, as a people, are mild and peaceful in their instincts, mirth-loving, generous, and content in their peaceful state. Though possessing superior powers of endurance, and great energy in action, the people, as a race, shrink from

retrofore, without a stimulus, ambition has not created objective desires. Accumulation, or even a desire to amass wealth, is almost unknown to their natures.

Communism is a creed among them, but is confined to the members of the family. This has ever been an effectual bar to the accumulation of property. Their aptitude is evidenced by the facility with which they receive and retain the teachings of the missionaries, learn the habits of farmers, and comprehend the power of the whites from unity, organization, and industry. Their ingenuity is displayed in the building of canoes, boats, barricades, and forts, as well as the simpler mechanisms and appliances used in daily life.

The Samoans are fond of music, though having no appreciation of melody. A crude harmony pervades their vocal music; in fact, their music keeps time to the stroke of their boat paddles, and, in marching, to the tread. In church and school each child seems to outvie the others in vocal power and compass. The discordance produced is in a measure compensated for by a soft and caressing language. Instrumental music is confined to the beating of sticks upon mats and hollow logs. The intelligence of the children and their tenacity of memory are significant qualities which give promise for the future, and are a hopeful index of the mental capacity of this people. I repeatedly examined classes in school, and was astonished at the quickness and precision of their answers, seeing quite young scholars who would repeat whole chapters of the Bible, answer every question in the catechism, while not a few very old ones would repeat any hymn called for by number from a book.

of a hundred hymns. But the processes of mathematics, analysis, and reasoning are laborious and irksome to them. Inquisitiveness is largely developed in them, though they exhibit a certain timidity in their intercourse with strangers.

Caste is esteemed a fundamental basis of society, but with gradation in families hereditary, and gaining in pride and power with each succeeding generation. To a stranger there are no outward evidences of caste, except in stature and physical beauty. The house and household appointments of the common man differ but little from those of the chiefs. He with the least pride of family owns his patch of land, his bread-fruit tree, taboos his cocoa-nut tree, cultivates his own tobacco patch, and paddles his canoe as free as the greatest ruler; but he looks to his chief for protection, obeys his mandates, and is his follower and servitor in time of war.

There is a reverence felt for and attached to the greatest family names, and the poorest man in Samoa knows the hereditary prestige of such a name. Formerly there were kings of districts with the general appellation *Tui*, as *Tui Atua*, *Tui Manua*, *Tui Aano*, &c., though great family names without position or governing power were and still are held in great reverence. Of such is Malietoa and the female branch of the family Tooa, the names of which are associated with the history and traditions of the Samoans.

In the districts appear local names of great families: in Monrovia *Leiatua*; in Atua, *Mataafa*; in Savaii, *Inu*, *Pau*, and *Asiata*, while Manua still has a *Tui Manua*.

The island of Tutuila has but one great name or family, *Leatua*, though it has a number of petty chiefs, the island being tributary to the district of Atua, in Upolu, where this family is powerful. The Samoan is especially polite. In meetings and councils much time is consumed in acts of courtesy and in the interchange of compliments. When a chief or a distinguished stranger goes through a village all noises cease. Traveling parties, *malaga*, are hospitably received and entertained. In their general intercourse violence, or even rudeness, is unknown. Women are the equals of men, except in government. The father carries the child as much as the mother, and joins in the preparation of food and in cooking. Labor is generally divided between them, excepting out-door work. A woman carries a burden or paddles a boat only from choice, and her hardest labor is the manufacture of native cloth.

In time of war women are emissaries, going from fort to fort unharassed. Her person is always sacred, as also are children. A chief's daughter is often the maid of a village. She is revered by her people though not governing them, and occupies a most prominent position.

Polygamy is common on the part of men, never on the part of women, though two wives seldom live in the same house. A plurality of wives is not common, a husband usually sending a wife to her people when he takes to himself a new one. Virtue in Samoa is predominant. It is regarded more powerful than caste, and was religiously observed before the introduction of Christianity. In the higher castes it is held more sacredly than among the lower. The maid of a village is revered more as a virgin than as a chief's daughter.

It is in their night-dances that the Samoans most assimilate in character to the other islanders. Often they are lascivious exhibitions, and after midnight grossly sensual, but are not proofs of practical licentiousness. In Hawaii, and other islands, they are characteristic of the people.

The primitive dress of the people consists of a girdle of *ti*-leaves, now made of cotton cloth and native *siapo*, though upon festive occasions, at meetings, and school exhibitions, the women dress in long trains of *siapo*, with bodices of "fine mats;" the hair is oiled, and abounds in ornaments and flowers. The disposition to assume the dress of the whites is growing, and in their efforts to don the new costume many ludicrous mistakes are presented. White gloves, silk dresses, enormous crinoline, high-heeled shoes, and old-style bonnets are brought into requisition for a "May day" costume—native, *fono*, or *talo tasi*.

The men wear foreign clothing only on special occasions, and this consists of army and navy uniforms which certain chiefs have acquired from foreign vessels, and which they are fond of displaying.

Tattooing (*ta tatau*) is universal in the islands, but does not mark distinction among the people, as with the Maoris of New Zealand. The skin is identical with all persons. The face is never marked. Women have a tattoo, except an occasional row of spots upon the upper arm. The process is long and very painful, the subject often compelled to have intervals of rest. The instruments are rows of needles like bone, held in a handle, fastened upon a stick about six inches in length, which is held by the operator, and beaten with a small hammer. The pigment for coloring-matter is lamp-black from the candle-nut, which gives the black color; the marking extends from a point on each side of the knee, upward to the umbilicus. This part of the body is marked out by a break, excepting lateral lines extending round the body from the umbilicus down to a point midway between that and the pelvis. The sacral vertebra is not marked. The upper line of marking from the knee, however, does not extend entirely around the body, but ends in opposite fine points on each side of the body. These two lines complete the process, and the operator must receive his pay before the last is completed. To be unfinished is a stigma, and no other tattooer would dare to complete the operation. The instruments are held in such esteem that money could not purchase them. To a people without any clothing but cloth around their loins, this indelible covering is very grateful to the eye, and no doubt originated in a natural sensibility to modesty. By law, tattooing is abolished, and will be substituted by clothing.

Like the Samoan is patient, earnest, and easily controlled by his chief. While cruel to their enemies, they are never treacherous; covenants and truces are religiously adhered to; neutral ground is sacred; prisoners are never taken; the importance of a victory is measured by the number of heads taken. The head is publicly exposed and reviled, never mutilated. At the proper time the women from the enemy's camp come for the bodies, which, with the heads, are rolled in white cloth and borne away for burial.

Like the Maori of New Zealand, the Samoan digs ditches, throws up breast-works, with fascines and parapets, builds forts and palisades, and constructs large double war-canoes, (*alia*), capable of carrying two hundred warriors. When a fort on the beach is to be assaulted, the canoes, heavily barricaded built on them, are pushed up abreast the fort, and the seamen in the water, upon the opposite side of the craft for shelter, where they await the proper moment for attack.

The national courtesy of the people and the general family relationship existing between them do much to ameliorate the horrors of their internecine strifes. At night, or under flag of truce, enemies will meet between hostile forts and exchange powder and lead or food with perfect in-

nocence, telling each other that they are wanting such things for tomorrow's work.

The native weapons are spears, clubs, knives, and slings, though they have come recently to adopt fire-arms; in the last war using canoes, muskets, pistols, and possessing some improved breech-loading rifles. Though wars among them have been destructive, yet one hundred disciplined white soldiers would preserve peace among them.

The industries of the people are confined to the building of houses, stone fences, canoes, cultivation of yam and taro, manufacturing native cloth and fine mats, fishing, and collecting food. Houses are generally built of the wood of the bread-fruit tree. A circle of posts surrounds a central pillar, which supports longitudinal beams. Upon these the framework of the roof is built, consisting of light sticks nicely spliced, making a succession of circles. These circles are again crossed at right angles by other sticks, and the whole is sewed together with sennit. The roof making a semicircle or inverted bowl, covered with thatched sugar-cane leaves and *ti*, the space between the outer circle of posts being open, though supplied with matting for walls, which are raised and lowered in fold, as a Venetian blind. The floor is slightly elevated above the ground, covered with pebbles, upon which mats are spread. In the center is a small stone fire-place, though but little used, as cooking is done in ovens or houses for the purpose. The houses are neat and clean, and are kept in good order.

Large sleeping screens divide the members of the family at night. In every village is a town-house, used for the reception of visitors and for entertainment. The Samoan excels in the construction of water-craft, and in his skill in the management of them.

The war-canoe (*alia*) is a double boat, often a hundred feet in length, one larger than the other, double-enders; hence the smaller boat may be both port and starboard, from 6 to 8 feet apart, the two firmly lashed together with heavy timbers, making a platform between them. Upon this platform a house is built. The single mast is in the center of the larger boat, stepped in a socket and raking forward. The main sail is built upon a frame, oval-shaped, but larger at the top, fastened to the top of the mast, and reaching above it, the lower tack of the sail stepped in a socket at the bow of the boat, and held by running lines. These boats do not tack ship, but carry the sail to the opposite end of the boat, and reverse inclination of the mast—in bad weather a hazardous performance.

The hull is made from a species of teak, the planks hewn out and fitted together, the length of the planks not being considered. They are sewed together from the inside through curved holes, the whole fastened to heavy frame-work. Not a nail or pin is used in the entire construction. The outer surface of the hull is smooth and of great formity.

The traveling boat (*amatasi*) is much like the *alia*, but smaller, slighter, and more graceful, the upper work of the hull often beautifully carved. They are justly celebrated for their speed and the cleverness with which they "lay to wind." The common village carrying boat, *taumaulua*, two bows, is a single boat, deep, and carrying one person, though usually propelled by paddles, built after the model of a war boat and of recent construction, though now in general use.

The universal craft is the single canoe, with outrigger, hewn from the trunk of a tree, and of all sizes. The outrigger is a stick pointed and lying parallel with the boat, fastened by horizontal sticks to the canoe. It requires practice and dexterity to manage it successfully; but in

native is at his ease, men, women, and even children showing mar-
 us expertness.

is the bonito-fishing canoe (*vaala*) which most tests their skill and
 es the boat and crew objects of admiration. It is a single boat,
 outrigger, built of planks nicely jointed, the model an imitation of
 lower half of the bonito, the point of the outrigger level with the
 of the boat.

ne position of a school of bonito is known by the sea-birds hovering
 them. Instantly the boats are launched, sometimes a flotilla. No
 m deters the fishermen from their purpose. Their boats mount the
 breakers, and seem to leap over the tumbling waves beyond. Both
 and paddle are used, the crew consisting of three persons. The
 rman is equipped with a bamboo rod, line, and shell-hook, with
 ers on the hook, which is trailed on the surface of the water.

ne speed of this canoe under sail is extraordinary. The models of
 e different boats forwarded to Washington are made of *ulu*, bread-
 wood, and are perfect imitations of each, sewed with sennit, and sails
 plete. The making of the mats is done exclusively by women, in
 ch they show great dexterity and exercise great patience.

ne coarse mats for floors (*papa*) are made by hand from the leaves of
paoga, the finer sleeping-mats from *falo*; both varieties of the *pan-*
us. Fine mats, (*ie-toga*), which I shall have occasion to revert to,
 also made by hand, from *lau-ie*, a grass and shrub.

ne shaggy mat, (*ie-sina*), much resembling a dressed sheep-skin, pure
 e, though often dyed black, is made from the inner bark of the *fau*
 (*hibiscus*.) The common cloth of the natives is made from the inner
 k of the paper-mulberry, (*ua*), an osier cultivated extensively. This
 is pounded wet upon a smooth log with wooden mallets. After
 process it is called *tutuga*. It is then scraped with shells and
 ched, the process called *lonua*.

ese pieces are carefully joined together, and others in layers placed
 n them, the whole intermixed with arrowroot, and beaten into one
 e of white cloth, called *tasina*. These pieces of cloth are painted with
 ous colors, yellow tumeric, (*malasina*), red ocher, (*ete*), black, from the
 le-nut, (*lama*), brown, from a solution of the scraped bark of the *oa*

The whole process of manufacture is called *elei*; the finished cloth,
 o, identical with the *tappa* of the Tahitians and Hawaiians. It seems
 onable that this bark would be valuable in the manufacture of paper.
 cheap, strong, light, and purely white; never subject to decay.

ne collection and preparation of *capra* is the chief industry and
 only article of export, excepting a very little oil, cotton, and fungus.
 h family has its cocoa-nut grove or trees. The nut is allowed to
 n, when it is husked, broken, and the meat or fruit taken from the
 l. This is cut into slices, dried, and sacked for barter and export.
 rmerly oil was extracted from the fruit by filling a canoe with it
 water, and placing it in the sun. The fruit decaying, the oil would
 to the surface, and was then collected. Of late years the *copra* is
 ped to foreign ports, the oil there expressed, and the residue goes
 nfectioners, and is made into oil-cake as food for cattle. This trade
 already attained great proportions, of which I will treat specifically
 after.

ne language of the Samoan bespeaks Malayan extraction, many
 ds in the two languages being identical; indeed, a general similarity
 ts between all the Polynesian languages.

ne alphabet contains fourteen letters, a e i o u f g l m n p s t v; two
 els cannot occur together; every letter is distinctly sounded; there-

fore there are no improper diphthongs. No two consonants can come together. The foreign letters, b, k, and r, are introduced in the writing of proper foreign names, as *Amerika* for America. No syllable consists of more than three letters, and each syllable ends with a vowel. The accent is generally on the penultimate, and is a certain guide in pronunciation.

In speaking the voice is raised, the emphasis falling upon the first word of each sentence. Reduplicated words have two accents. In ordinary conversation there are words which it would be an insult to use to a chief or stranger, as *ai*, to eat, to a chief, *tamafa*.

A stranger in Samoa might suppose there were two languages. So, but there are delicate terms, expressive of respect, used in speaking to a chief, though a chief never uses them in speaking of himself. The language is soft and harmonious, easily attained by English-speaking people.

The adult speaks slowly, and without gesticulation; while the children are rapid in their utterances, and filled with mirth and laughter. Prominent chiefs have what are termed "talking-men," who are mediums through whom they communicate their wishes and transact business. Upon great occasions the orator leans upon a staff, speaking in a deliberate manner, and is listened to with attention and in silence.

It is claimed by persons long resident in the South Sea Islands that the Samoan is the only Polynesian language having a word to express thanks or gratitude—*faa fetai*. They certainly are unceasing in the use of this work, which has its prefixes and affixes.

The language is allegorical, and generally oriental in style. Though it is usually expressed in figurative language, as may be seen in some of the papers accompanying this report. Samoan has become a written language through the labors of missionaries among them.

Rev. Drs. Pratt and Turner, of the London Missionary Society, have made a dictionary and grammar, and, in connection with Revs. Williams and Powell, of the same society, and Rev. George Brown, Wesleyan, have translated the Bible, hymns, catechism, and other books for religious instruction.

It is difficult to find a child over seven years of age who cannot read while the greater portion of the adult population read and write. Not that they possess a written language, with missionaries and teachers on hand as interpreters, there is no incentive to learn English; besides, to them the attainment of a foreign tongue would prove extremely difficult.

Of the early history of Samoa nothing is definitely known. There are native traditions of their race, but they are exceedingly vague. "Famats" and a "great talking-staff" are claimed to be several hundred years old. Of such relics, treasured from generation to generation with great care, there seems to be some historical precision.

But ruins in the interior of the islands, and the roads and the caves of Savaii, are a sealed book to the natives; and to the question "Who built them," the quick answer is, "The evil or good spirits."

Though Christians, they are still believers in their crude mythology and history. Every island, mountain, and many trees, fruits, birds, and fishes have associated with them some mythological tradition.

Their mythology, though not so heroic, symmetrical, instructive, classical as that of the Greeks and Romans, is scarcely less pleasing. The origin of every great family-name has a curious mythical tradition and with these all the natives are familiar. These islands were first discovered by the Dutch "three-ship expedition," commanded by R. van Ween, in 1772. La Perouse touched at the island of Tutuila in 1791.

of his officers, M. de Laugle, and boat's crew, were killed by the natives on the north shore of the island, nearly opposite Pagopago. A small estuary still retains the name "Massacre Bay," though it is three miles from the scene of the massacre. From this circumstance the islands were avoided by navigators, and the natives looked upon as exceedingly savage and treacherous.

The natives still preserve the tradition of this occurrence, and speak of it with a sense of shame, but very naturally throw the blame on the French.

Certain it is that the natives were dreaded and the islands avoided until 1830, when the Rev. John Williams, the martyr, landed at Sopapalii, the island of Savaii, and left some teachers from other islands among them. About this time Tamafaigna was the principal chief of Savaii, and Tupuo, Savaii, and king of Manono. He was not a hereditary chief, but a usurper, cruel, remorseless, but a man of superior intellect. He came to be a spiritual as well as a temporal ruler, with great political power. Fortunately for Christianity, he died a few days before the landing of Williams. War was still raging in Aana, the adherents of Malietoa gradually gaining power.

Mr. Williams was instrumental in the conversion of Malietoa to Christianity, and peace was declared. At this time Williams devoted himself to the study of the natives, their habits, customs, and religion. He found no evidence of idols, altars, priests, or sacrifices. Mythology and superstition constituted the sum of their religion.

The bat was held in reverence; also the bonito, stars, and moon. To these were the emblems of Deity. Priestcraft and powerful priests, and their interested and sanguinary offices, were unknown.

Cannibalism and infanticide were never practiced by them, and to-day the native makes boast of this fact.

A remarkably prolific soil, filling the island with extraordinary abundance, and bringing food in the greatest plenty and variety to every family, with the slightest exertion on their part, may have served to deprive one of the most powerful incentives to these barbarities, found in the islands where the means of subsistence are precarious, and difficult to obtain. Williams found, in 1830, that the natives knew something of Christianity, and readily accepted it. This knowledge evidently came from the rude teachings or influence of castaway sailors, as the natives could speak of the white men among them, long before the arrival of missionaries. Of such was "Dan, the convict," who captured a vessel, the *Roma*, murdered the captain, burned the ship, and landed in Savaii. He could neither read nor write, yet taught the natives, through their superstition. Such another was "Jimmy, the sweet," who regularly preached to them. Many interesting stories are related of these characters by the natives.

In October, 1832, Williams returned to Sopapalii, and found Christianity rapidly spreading over the islands. On November 23, 1833, he arrived in the harbor of Pagopago, Tutuila, and found the people Christianized, and then testified that the Samoan far surpassed the Tahitian in amiability of character, the acquisition of knowledge, and in the facility with which the children learned to read and write.

For a period of nine years, from 1849 to 1858, a bloody civil strife raged between the different districts of Upolu and the small island of Manono, the latter being the ally of Anna, the western district of Upolu, arrayed against Atua and the Tua Masaga. The horrors of this war are still fresh in the minds of the people. The recent war which ended one year since was not so sanguinary or destructive of property,

and was mainly the result of intrigue and a mercenary desire upon part of ambitious and evil whites, and at a time, too, when the Samoans were coming to appreciate the benefits of peace. Of this war I will treat more fully in the history of my intercourse with the natives.

In 1839 Commodore Wilkes gave to the group a population of five thousand six hundred. This could only be an approximation to an exact number. At that time a correct census could not be taken, and the number of the population was mainly conjectural. I incline to the belief that this was an overestimate, as it was shortly after the Aana war, which was the most destructive strife known in their history. A correct census, taken in 1863 by the missionaries of the London Missionary Society, gave a total population of thirty-four thousand six hundred and thirty-three.

In 1869 the religious census taken was as follows :

Manua, Oloosiga, Ofoa	1,
Tutuila, Annu	3,
Upolu	16,
Manono, Apolima	
Savaii	12,

Total 35,

The religions were divided as follows :

Adherents of London Missionary Society—Independents, Presbyterians	27,
Wesleyan Church	5,
Roman Catholic	3,

Total 35,

This census shows a decrease in the population of five hundred and four from 1863 to 1869, supposing the former census to be correct, the latter being absolutely correct, each family, and every member of each family, being known to the missionaries and the native teacher in every village. The recent war, which lasted two years, may account for the decrease, as society and families were disrupted; though, perhaps, more than one hundred people perished in actual strife. It is estimated that there has been an increase of native population in the last year of about one hundred and seventy.

The first organized efforts for the Christianizing of the natives were inaugurated by Rev. John Williams in 1830, and, as has already been stated, the natives rapidly and honestly accepted the teachings of the missionaries, and their precious seed fell upon good soil. The natives were kind, hospitable, and apt in learning. The missionaries, who had encountered a thousand dangers in other islands, here found "green pastures and still waters." Now a Bible is found in every house; daily prayers are the rule, and not the exception, in every family. There is a church in every village, built of stone, and plastered, inside and outside with lime made from coral. Divine service is regularly attended by the whole native population.

A missionary has jurisdiction over a district. In each district are native teachers, usually one for each village, who are educated and regularly assigned to duty.

The London Missionary Society have a religious training institution at Malua, twelve miles west of Apia. It was established in 1854. It embraces a spacious church, resident-missionary house, and neat stone houses for students, making a square, with cultivated plaza in the center. The object of this institution is to train native ministers. There are in it two classes of students: first, candidates for the ministry, and second, youths who, on the completion of their term of study, either

return home or enter the higher classes. The course for each class is four years. The present number in attendance is—

Candidates for the ministry	67
In junior classes	18
Total	85

Forty-eight students in the senior class are married. In many cases their families are with them. The subjects of study are reading, writing, and arithmetic, Scripture exercises, theology, church history, geography, elementary lessons in astronomy and natural history, with a very little English.

There are usually two missionaries resident at the institution, but at present it is under the exclusive jurisdiction of Rev. S. I. Whitmee, an earnest, devoted Christian, whose district comprises nearly one-third of the island of Upolu, all of Manono and Apolima, and a portion of Savaii, having under his supervision fifty-four native ministers and teachers. It is the custom of the missionaries to make regular tours through their districts, and once a year to hold *mago*. At these meetings the people contribute in money to the missionary society.

It is erroneously supposed by some that this is an imposition upon the natives, and wicked whites charge the missionaries with levying a cruel tax for the maintenance of themselves and families in luxury. This is a gross misrepresentation of facts. The money is appropriated for the education and comfort of native teachers, and is inadequate for the purpose.

I have been with missionaries of each denomination, stood beside them in the pulpit, and know that they cautioned their people not to give more than they could offer without discomfort to themselves, often refusing money from the poorer people. At every collection the money is counted, a minute made of it, a copy given to the village teacher, the amount proclaimed in church, and posted in a conspicuous place.

The missionaries dispense medicine to their people. This is a grave error. Excepting Dr. Turner, of Apia, none are regularly-trained physicians. They adhere to the old school of practice, and ignorantly dispense blue-mass, gray powders, calomel, and other preparations of mercury, while Dover's powders, podophyllum, preparations of arsenic, &c., are freely given. I foresee in this reckless issuance of drugs no little mischief in the future, as mercurial diseases must certainly develop themselves unless it is abandoned; and I have communicated my impression to Dr. Turner, a missionary, and also a skillful physician, trained in European colleges. He at once agreed with me. This mistaken kindness I believe will be given up. The confidence of the natives in the missionaries is unbounded, and the influence of the latter is almost unlimited, though there are some exceptions to this remark.

As an instance of their power, during the recent war the Rev. George Brown, Wesleyan, learned of the proposed march of a large war party and intercepted them. He deliberately seated himself in their path, and the little army, in the full panoply of war, halted. They dare not march around him. Speeches were made, the warriors entreated that he leave the path, not a few stalwart fellows shedding tears. He was, however, determined in his purpose, and ordered his bed for a night camp. On each side was clear, open ground, but it was sacrilege to march around him, and they were compelled to return home, as he had "tabooed" the roadway.

The native teacher wears pants and a white shirt, often a white tur-

ban. This dress is a distinguishing mark, and in it he is never molested in time of war; but, being only a common man, he is not admitted to the inner society of chiefs, caste herein being arbitrary, and working little harm among the people; and for the correction of this evil missionary influence has hitherto been powerless.

The adherents of the Roman Catholic Church are principally confined to Atua, the eastern district of Upolu, and rank among their number Mataafa, a great chief.

The adherents of the London Missionary Society and Wesleyans are interspersed throughout the entire group. It is safe to say that there is not a single Samoan who has not accepted Christianity, though more devout and zealous in some districts than in others. I cannot speak highly of the intelligence, patience, fortitude, and high moral attributes of the missionaries of Samoa. By their religious instructions and good lives, and the practice as well as inculcation of the domestic and social virtues, they have exerted over the natives a wonderfully transforming power in less than half a century changing, in many important respects, the whole moral aspect of the islands. Indeed, it is not possible to estimate the degree of elevation effected by their presence and agency. These are beyond all doubt more important and effective instrumentalities in the civilization of this people than all other causes combined. Excepting a few traders in lonely districts, the whites are covertly hostile to the missionaries. They are German and English from the colonies congregated at Apia, tradesmen and liquor-dealers, who look upon the natives and their property as common plunder, and with mercenary motives often seek to corrupt them. Hence the missionaries look with suspicion and fear upon them. They are a class long resident in Apia, and know nothing of the natives or country. They are absolutely selfish in their purposes and plans, and hence add nothing to the common stock of knowledge or usefulness of the community.

The performance of the marriage ceremony by native teachers or regularly ordained ministers is certainly objectionable and justly opposed by the Roman Catholic clergy. Even this is better, however, than the original Samoan custom, where the consent of the relatives of both parties and the presentation of "fine mats" was sufficient to make a betrothal lock, though not to insure it against a desire to take a new wife, casting off the old one, who will again, in turn, bring "fine mats" to the family of the groom.

Until recently the marriage of a chief's daughter, especially the daughter of a village, was an occasion of great ceremony, and so sacred was the virtue esteemed in a female that the maid, in the presence of great chiefs and the families of both parties, was compelled to submit to a painful, unnatural, and equivocal physical test of virginity. This barbarous custom to some extent still prevails, and, though a part of the unwritten history of the Samoans, is too well known to admit of doubt. This, and other native customs, is yielding to missionary teachings and the progressive attributes of Christianity.

The general sobriety of the natives, and their appreciation of knowledge introduced by the whites, add greatly to their tractability, and argue well for their future advancement.

Present indications are that these people will soon occupy a much higher place in the scale of minor nations than most of the Polynesian islanders. With them Sunday is a day of rest and religious devotion. Food is collected on Friday and prepared on Saturday. On the Sabbath scarcely a boat is to be seen; the hunter is never in the woods during its sacred hours. Attendance upon church-meetings affords almost

sign of life; even the sports of the children are sacrificed, in a degree, to the strict observance of the day. To a stranger the places seem deserted. In some districts, however, the "great days" are observed even if they fall on Sunday.

The "great days," Tâtele and Tâteleza, are the first and second days of the *palolo*, in the last of October. The *palolo* is a sea-worm which appears on two successive days in every year in some of the openings of the reefs, appearing at daylight, and disappearing with the rising of the

These marine worms are about 18 or 20 inches in length, are highly esteemed for food by the natives, and are taken in vast quantities by them. They seem to understand the precise day when they will appear, coming that day before their appearance the land and robber crabs to the interior and seek the salt-water. Before dawn every native is ready. Every vessel capable of bearing man, woman, or child is brought to requisition, and the reef-passages at dawn of day are alive with canoes and noisy with exuberant life.

The Samoan "fine mat," enters more largely into all the political ramifications of the people than any creed, custom, or tradition which they have ever held. It protects caste, fosters the ignorant independence of the people, and alone serves to perpetuate barbaric prejudice. A husband will leave his wife for another with no other motive than the acquisition of a "fine mat." War may be declared and peace made for the possession of a sacred mat. Families count their wealth, and all personal and real estate is computed, by "fine mats." Chiefs and nobles have fine mats, but only districts and government have sacred mats. The Tui Atua, sacred mat, now in my possession, is the emblem of the nationality of Atua, and its surrender is a virtual surrender of the nation, and an evidence of their good faith. The history and sacredness of this cloth are known to most islanders of the Pacific. For the establishment and maintenance of a home and foreign government in Samoa, the hereditary and fictitious value of "fine mats" must be destroyed. This could best be done by affixing a government stamp making them a circulating medium subject to redemption, as is done for money.

The entire Samoan group (excepting outlying islets, or rocks before mentioned) has, according to Wilkes's survey, a superficial area of six hundred and fifty square miles, viz:

.....	700	Oloosiga.....	24
.....	560	Ofoo.....	10
.....	240	Manono.....	9
.....	100	Apolima.....	7
Total			1,650

The height of mountains and depth of valleys, with general average physical structure, make an astronomical survey uncertain. I would not be able to give area at higher numbers in this as well as all other tables and maps made from astronomical observations.

The island of Annu, lying to the southeast of Tutuila, and separated from the latter by a deep channel nearly one mile in width, has an area of about ten square miles, with a population of three hundred and fifty. It is surrounded by a coral reef, the general land-surface about 25 feet above the sea-level, with a bold headland on the eastern extremity 515 feet in height. On the channel side is the village, in a cocoa-nut grove. The island is very productive, growing the two varieties of long-fibered island cotton without cultivation. A very little tobacco is culti-

vated. This is the only island of the group where the natives are not subject to elephantiasis.

Manua, the easternmost island of the group, is nearly circular in form, that portion exposed to the southeast trades presenting a bold basaltic front, rising precipitously to a height of over two thousand feet. The remainder of the island is protected by coral reefs. Upon the north is the village of Faleasao, with good anchorage except during a norther.

Tau, the principal village of the island, is upon the western shore, looking toward Oloosiga, without a harbor, and the roadstead insecure. This is the residence of Tui Manua, who has kingly jurisdiction over Manua, Oloosiga, and Ofoo.

Manua rises like a great dome from the water, and upon the south and east is exceedingly precipitous; upon the north and west it rises more gently, with a narrow belt of flat land, covered with cocoa-nut trees next to the water. Ascending the mountain from this flat, small plateaus are found prolific in bread-fruit and bananas; the soil rich, and moistened by frequent showers; the entire island clothed with vegetation to the mountain summits.

There are no living streams on the island; springs of brackish water, at the sea-level, and cocoa-nut water supplying the necessities of the people.

Upon this island the largest cocoa-nut in the world is found. The Manuan shells are used for water-vessels, and have ever been highly prized by other islanders. A single green nut often furnishes more than half a gallon of water. The natives of Manua are exceedingly primitive, and have but little intercourse with the outer world.

Native traders carry their oil and copra in open boats to Apia or Pago-pago for barter. All are Christians. The white-walled church in the center of the village is a conspicuous object to a passing vessel.

Oloosiga, east of Manua, is distant four miles, the channel deep, subject to protracted calms, as Manua is a barrier to the southeast trades, and serves to deflect the winds. The island is a crater cone about 800 feet in height, the southern exposure a pearly perpendicular wall, with a very little level land upon the north and west, where two villages are situated. The slope back from the villages is gentle for several hundred feet, and is susceptible of a high degree of cultivation, Ofoo, to the west and separated by a narrow channel, was evidently at one time a portion of Oloosiga. The height of the island is 500 feet, not so abrupt as the other; the ascent easy, with few crags or precipices. The almost entire land-surface is susceptible of cultivation.

There is but one village upon the island Ofoo. The population of these two islands is very meager. They are subject to Manua. Islands and people have the same general characteristics. In the table of populations I incorporate them with the larger islands.

Tutuila is distant from Manua sixty-two miles, west, and is the third island of the group in size and importance. The eastern end is a confused and broken mass of lava; huge quantities of basaltic rock, segregated and separated from the mainland by narrow channels; the sea-front bold and abrupt, against which the waves break in endless fury. The entire eastern portion, comprising two-thirds of its area, is a chain of mountains, the trend of which is nearly east and west, with an average height of 1,200 feet—domes, cones, and precipices—the base of the mountain almost laved by the sea. The slopes and ravines are steep, with an occasional bench and perpendicular precipice; villages nestle at the mouth of ravines or on the sea plateau.

The prevailing showers seem to keep alive the very small streams

glide half-hidden down the ravines. In the dry season this supply of water is very precarious. The mountains are covered with vegetation, but the trees are gnarled, and mostly inaccessible.

Aur, on the northeastern portion, and sheltered by a bold promontory from the trades, is a fair anchorage, which would be adequate for the copra trade of the natives.

Excepting the growth of cocoa-nuts upon the shore-line it would be difficult to conjecture how this portion of Tutuila could be made available for commercial or other purposes. Nearly all this portion of the island is under the jurisdiction of the Leatu family, at Maseefau, the head of which, "Bully my cow," is at Atua, Upolo, where he is also a prominent chief, and recognized the ownership of Tutuila by Atua.

The island is nearly divided by the bay of Pagopago. The bay at the head of the same name is less than two miles from the northern coast of the island, the mountain-chain falling, leaving a gap of less than one hundred feet in height, rising again to the west until it culminates on Matafau, 2,327 feet, the highest peak on the island. The remainder or western portion, about one-fifth of its area, is a level tract of country with occasional gully or water-way. This tract, embracing about 30,000 acres, is, in many places, a deep, dark forest, the timber-trees abundant and accessible.

Open lava covers much of the land-surface, but the soil is a loose, sandy loam, moistened by showers and protected from the sun by overhanging foliage. Here the fruits and vegetables of Samoa flourish abundantly. Upon this tract of land are found more interior villages than on any other part of the group. The shore-line of this part is also irregular, with little coral formation, the south shore being a lava plateau perpendicular sea-wall, over which the sea, during a storm, breaks. At the western end of the plateau and the southwestern extremity of the island rises abruptly like a tower, called "Sail Rock," which can be easily seen from the entrance of the bay of Pagopago. Around this point and distant three miles is Leone Bay and village, with a secure anchorage, except during a norther, the inner waters of the bay having a coral reef, nearly awash at low tide, but has sufficient depth of water for large vessels.

One is the residence of the vice-commercial agent of the United States. This part of the island is well supplied with fresh water, the streams being fed by the continual rains upon Matafau, the water of which inclines to the west.

About two-thirds of the population of Tutuila is west of Pagopago, divided into four districts, and governed by Fuimona, Tuitele, Satele, and Le Tuli, all hereditary chiefs.

Looked for Pagopago from the east and northeast both Tutuila and Upolu are sighted, and the channel between the islands is disclosed. Looking through this, and following the line of coast seven miles, Maker Point and Tower Rock are plainly seen, though these points are at opposite sides of the entrance to the bay, yet so uniform is the configuration of the coast and so luxuriant the foliage that the opening is difficult to determine, even with a glass, at a few miles distance. Parallel with the coast, and distant from a mile to a mile and a quarter is a coral-bank with five, six, and seven fathoms of water. The northern end of this bank, at the time of Wilkes's survey, extended to a point nearly south of the center of the opening of the bay, or Whale Bay. That it has extended and is still growing there can be no doubt, though the depth of water over it is unchanged.

The present western extremity is one and two-tenths miles from the

coast, and bears south half point east from Tower Rock, with fathoms of water. Here the outer section of the bay is seen, with Blunt Point and Goat Island upon the left, and Grampus Rock upon the right of the bay in plain view. Breaker Point on the west, and Tower Rock, an isolated rock 140 feet in height, on the east, mark the entrance to the harbor, which is 4,020 feet in width, having thirty fathoms of water.

Within the entrance, and more nearly opposite Breaker Point, is Point Distress. Upon the same side, and distant from Tower Rock 2,700 feet is Blunt Point, an abrupt promontory, making an excellent landing for Whale Rock, a basaltic mass about 60 feet in diameter, nearly mid-channel, and opposite Blunt Point. The mean depth of water, high and low tide, over the rock is 12 feet; a very trifling expense would move this, the walls of the rock being nearly perpendicular.

Goat Island, with an area of two acres, is distant from Tower Rock one and a quarter miles, same side of the bay, and connected with the mainland by a coral reef. It marks the entrance to the inner bay, and is nearly north from Tower Rock.

From Goat Island the trend of the bay coast is west one point north to the village of Pagopago.

From Breaker Point to head of bay on east and north side the coral reef is narrow, and opposite Goat Island, at Grampus Rock, is but a fringe upon the shore, the other shore presenting a greater width of coral reef, which is generally awash at low tide.

The estuaries in the bay have a shallow-reefed bottom, the outer edge of the reefs falling off quickly into the deep water.

Midway between Goat Island and the head of the bay is the village of Fagatono, inside of Swimming Point.

Immediately beyond the village a sharp coral point, exposed at low water, stretches out into the bay, between the point of which and Swimming Point a large vessel could securely lie.

Upon the shore of the miniature bay, and adjoining Fagatono, the Polynesian Land Company have bought property and erected a trading house; they have also purchased a small tract of land upon the opposite side of the bay. At the head of the harbor is the village of Pagopago, where Manga, the chief of the district, (comprising the bay villages,) resides. He is a native of Manua, not an hereditary chief of prominence, and became a temporary ruler through the influence of the missionaries. It was a mistaken policy, now regretted by them. His people are restless, and neighboring chiefs and districts are exceedingly hostile to him.

The bay of Pagopago is surrounded on all sides by precipitous mountains. Native houses in small villages cluster at their base.

When the rains are long continued, there are small rivulets found at the mouths of ravines; but, excepting the one at Pagopago, there is not a living stream flowing into the bay, and even this can scarcely be dignified with the name of creek.

An occasional flat or gentle declivity upon the hill-sides of a few acres grow bananas, oranges, taros, yams, and bread fruit, while cocoa-palms line the shores, and fish are abundant; hence a scanty population may thrive here.

The high mountains completely shutting in the bay in a measure lessen the influences of the trade-winds, or they are materially neutralized by the exuberant growth of trees and other rank vegetation.

The mountains generating moisture, the rains are almost continuous. The artist accompanying me devoted much time to the bay of Pagopago and its surroundings. The security of this harbor is undoubtedly

any in the world could be more safe, while it is sufficiently capacious for considerable navy. For a naval and coaling station it would be at all times accessible and absolutely secure. Piers and wharves could be built upon the coral reefs, with great depth of water alongside, at trifling expense, and a sufficient supply of fresh water could be obtained at the head of the bay for general depot and shipping demands, but the insignificant amount of cultivable land around the bay, and the consequent necessity of drawing supplies from the leeward end of the island, and the absolute lack of industrial resources immediately about the shore, preclude the possibility of its ever being a populous or important place. These facts, however, may add to its desirableness as a naval coaling and general repairing depot for the Government. The prevailing opening to the south, and prevailing winds from the southeast often bringing fresh, sailing-vessels, especially square-rigged ones, have great facility in beating out.

I have seen a small English ketch five hours in working from Swimming Point to the entrance, a distance of less than two miles. Upon Baker Point a light-house could be constructed, the light of which could be seen at a great distance from the shore, rendering approach at night perfectly safe.

Knowing that Pagopago has attracted much attention and been recommended upon, I confine myself chiefly to a statement of topographical facts, withholding comments.

Upolu, forty miles west of Tutuila, in population and resources is the most important island of the group. The trend of the mountains is across the island, *i. e.*, from east to west. The highest peaks are nearly 6,000 feet in height; sharp cones lifting themselves above the mountain-range, and great crater-walls, broken, seamed, and indurated; the volcanic crests almost inaccessible, though, like all other portions of the island, covered with vegetation. At this altitude rains are almost continuous, and the high mountain-gorges have clear, pure rivulets with successive cascades, which unite in streams of considerable volume, affording, and, perhaps, as large as any water-sheds in the world of equal extent, this having an area of less than six hundred square miles. The upper portion of the mountain-range, less than 1,500 feet, is sharp and narrow in outline, comprising, perhaps, one-sixth of the land-surface of the island, and is practically valueless. The remaining five-sixths of the island are cultivable, though varying in adaptability. The mountain-chain throughout its entire length is contiguous to the northern shore, falling rapidly into the ocean with many bays and abrupt headlands; oftentimes the approaches to the mountains easy; and the plateaus and open valleys.

The available land surface on the south side of the island is limited and generally difficult of approach from the sea except for native crafts. The south shore-line is abrupt, narrow lava-tables, bold precipitous promontories, and shallow estuaries, with coral reefs stretching across the entrance.

Fresh water is abundant, though the streams are small. The bay of Plohi, though by no means a secure harbor, is a good anchorage, and affords sufficient shelter for vessels employed in the local trade. After leaving the broken declivities and deep ravines high upon the northern side of the mountains, the fall of the land surface is gradual to the south with an occasional abrupt descent, but many long, wide stretches of level country are seen, covering an extent of thirty miles in length from six to twelve in width.

Between Salo Salo and Fagaloa is a piece of table-land, nearly level of about ten square miles in extent.

The northern portion of the island east of Fagaloa is somewhat broken, with lagoons reaching into the interior. The bay of Fagaloa, the most prominent, could, by improvement, be made a valuable harbor but no circumstances would warrant an expenditure of money for that purpose, as the entire north shore of the island is naturally tributary to the port of Apia.

The inner passage between the reef and shore at high water insures easy communication for small boats, and such bays as Fagaloa, except during a gale, afford sufficiently good anchorage for vessels acting as tenders to ships taking in cargo at some secure central port.

Apia is a reef harbor, the approach from the northeast through a deep breach in the coral reef, the outer line of reef exposed at low water upon which the ocean swell breaks continually.

The walls of the channel are perpendicular or inclining inward. This passage opens into a nearly circular basin having two low-lying points, one upon either side, as a crescent reaching seaward—Matautu on the east and Mulinuu on the west. Beyond these land-points the coral reef extends half a mile seaward.

A very heavy gale from the north may force the waves over this reef and damage shipping in the harbor, but a sea-wall built upon the reef from the land upon the west side of the basin seaward would effectually protect the harbor. Such a barrier could be built of broken lava and earth upon the nearly-exposed reef, and planted with cocoa-nut trees at a comparatively trifling expense.

The harbor is similar to that of Honolulu, Oahu, the anchorages from six to fourteen fathoms of water. The removal of a few coral rocks near the shore would add greatly to harbor facilities, while a half mile of wharves could be built, which, with the sea-wall indicated, would render the port of Apia a secure and valuable depot, as well as a general maritime resort.

The richness of the soil, the varied resources, capable of supporting a large population, and its central position as to population and area make Apia the natural *entrepôt* for Samoa.

For port and shipping industries labor could be aggregated and supported. The surrounding country is of greater area and general adaptability than that of any other port in the group; the climate healthy and the port as nearly on the commercial track between San Francisco and the English colonies as any other point in the group.

The white population of Apia number about one hundred and eighty, chiefly German and English. The town is separated by Apia Creek into Matautu and Apia. It is the residence of English, American, and German consuls, while the Roman Catholic bishop, Elloy, acts as representative of the French government. It is the headquarters for the Pacific islands of the commercial house of Goddefray & Co., Hamburg.

The foreign residents are mostly traders from the colonies, with small stores and liquor-rooms, trading with natives and living generally upon less lives, having no sympathy with the natives, and for selfish purposes ever prepared to foment trouble between the different districts, at times of war furnishing them arms and ammunition, and purchasing valuable tracts of lands at paltry prices from irresponsible claimants and members of rival families. But few of such titles are really valid. The trade of Samoa is virtually controlled by the German house of Goddefray & Co., Hamburg, formerly represented at Apia by Mr. Weber, now present by Mr. Alfred Pappé, who is also the German consul.

The exports are cotton and *copra*, the former insignificant at present, but the *copra* trade is considerable and growing into larger proportions. *Copra* is the dried meat or fruit of the ripe cocoa-nut, which is gathered and prepared by the natives. It is shipped to Europe, where it meets a ready sale. The oil enters largely into the manufacture of the best candles. The *copra* in European marts is quoted at about \$95 per ton. There being no regular opposition, it is purchased from the natives at about \$35 per ton in trade, equal to about say \$20 per ton. Some money has been introduced into the islands by the same firm—Bolivian silver coin, "cast iron," worth about 73 cents to the dollar, which passes current at par. In this trade Goddefray & Co. employ a number of first-class vessels. Many of them make the outward passage in ballast, returning laden. In fifty-five days that my schooner was in the port of Apia the following vessels received freight:

Goddefray & Co. with *copra*:

	Tons.
Ship La Rochelle.....	1,000
Ship Susannah Goddefray.....	1,250
Ship Carza Goddefray.....	850
Bark Elizabeth.....	600
Bark San Francisco.....	520
Bark Waudram.....	480
Brig Susannah.....	220
Total.....	4,920
English:	
Schooner Kenilworth.....	115
Schooner Dauntless.....	75
Brig Sea-Gull.....	120
Total.....	310
Grand total.....	5,230

Supposing this ratio to hold good for the year, we should have a yearly export of 34,775 tons, with a home value of \$3,303,625. The carrying-capacity of these vessels is much greater than their registers, but through tenders and trading-posts of other islands a large quantity of *copra* is brought to Apia for final shipment. The exact annual *copra* product of Samoa alone it would be difficult to reach, as the Germans are jealous of investigation; it is, however, equal to one-half of the above figures, and could be trebled in a short time. This is a trade which should be diverted to the Pacific States, where the consumption of candles in the mines is very great.

In the town of Apia is a Roman Catholic mission, French, owning a thousand acres of land immediately back of the settlement. Much of it is under a high degree of cultivation. The bishop has selected land upon the mountain-slopes, and already done some work for the growing of coffee.

Apia Creek, in the interior, would supply abundant power for sugar and saw mills. West of Apia and adjoining is Mulinuu Point, the present seat of the Samoan government. This neck of land is quite narrow and low, separating Apia Harbor from a broad lagoon, but very shallow.

From Mulinuu to Mulifusnu, the western extremity of the island, the shore-line is low, and has an outer coral reef the entire distance, with breaches at intervals, opening into small bays, with inner water communication at high tide for small crafts. The shore presents an unbroken

line of forest, gently rising toward the interior, exhibiting a landscape of surpassing richness and beauty.

Upolu is divided into three great districts—the eastern end of the island known as Atua, the middle Tuamasaga, and the western Aana. Formerly each of these great districts was controlled by a king, Tui Atua, Tui Masaga, &c. The theater of the recent war was at and about Apia (the town and property of the whites being neutral ground,) the Tui Masaga being invaded by Atua, Savaii, and Manono, the former having for an ally the district of Aana, with a revolting subdistrict of Atua. The origin of the war was more in imaginary disagreement than in real grievance. The desire for some fixed and settled form of government has been paramount in the minds of the people.

The adherents of young Malietoa, who is the direct heir to the family name, and who lives with his aunt Emma or Patosino, near Apia, were won over by evil people and an insidious policy, taught to believe that his uncle was also a Malietoa, in Aana, was seeking to be made king of Samoa.

The little island of Manono, ever the governing power, declared war on Young Malietoa, after vain remonstrance, went into retirement with his aunt, and for two years the war raged around them. How far Mataa, the great chief of Atua, and the single native representative of the Roman Catholic Church, was interested, may be conjectured. Certain it is that the whites in the port were the gainers, and their hostility to missionary influence became pronounced. Manono, one and three-quarters of a mile west of Upolu, and separated from it by a shallow channel with a submerged coral reef stretching across, has an area of but nine square miles, rising gently from the water on all sides to a height of 400 feet.

There are but few timber-trees; bread-fruit and cocoa-nut carefully nursed upon the whole island; the Samoan fruits and vegetables cultivated, the whole area consisting of gardens and miniature plantations.

Springs of fresh water, except in very wet seasons, are few and the supply uncertain, though the beach at low tide furnishes sufficient brackish water, while there are wells of fresh water in the villages. There are five villages, making a continuous town on the northeast and south shores. The western shore is not so thickly settled. The island is entirely surrounded by a broad reef with narrow passages, at intervals opening into lagoons, the one upon the south large enough to admit a small light-draught vessel.

Among Samoans Manono has ever been held in high esteem and her power dreaded. Her fleets of war-cauoes are large and manned by skillful and hardy crews, her influence in council preponderating either for war or peace, though in the recent war Manono lost much of her prestige by suffering a defeat in a naval engagement near Malua near the Tui Masaga.

The island is under the jurisdiction of the Leiatoua family, (fighting fishes,) having at present two representatives. One, Pelaopo Leiatoua, a lizard—was admiral of the Manono and Savaii fleets, and fired the first gun in the last war. A channel, six and a half miles in width and of great depth, divides Manono and Savaii; about midway is the island Apolima—hollow of the hand—containing seven square miles, an iron-bound fortress, nearly circular, with perpendicular wall-like sea front. It is an extinct crater, with its northern wall broken through to the sea level, the opening 200 feet in width, with a narrow boat-passage between basaltic rocks of not more than 15 feet in width, opening into a small basin.

The crater rim of this island is thin, giving a bowl-like interior, which is one of the most picturesque of land scenes.

pon a slightly elevated bunch is the village. The interior of the island is exceedingly fertile, with an abundance of fresh water. The island belongs to Manomo. In time of war the former sends its non-combatants to this island-fortress, which could be defended by a few men against any native force. Savaii, about four miles west of Apolou, is the largest island of the group, and less is known of it by foreigners than of any of the others. In approaching it it has a dome-like appearance from all quarters, though, like Upolu, the south side is more precipitous than the north, the water-shed, consequently, much more elevated.

Unlike Tutuila and Upolu, the mountain-range is not crowned by high peaks; has fewer precipices or abrupt declivities, the general ascent is by the water on the northwest and east gradual, the extreme altitude only 5,000 feet; the forests of greater extent than those of Upolu, but stretches of level or table land far inferior; streams not so generally interspersed throughout, two-thirds of the island east not having a single perennial stream, the natives being compelled to use brackish water percolating through the sands at low tide from Asou on the north and the western end of the island, and as far east on the south shore as Salailua. This fact evidently influenced Wilkes in the statement that there was a want of fresh water on Savaii. On the contrary, the two best streams in Samoa are on the eastern part of Savaii, one emptying into a small bay near Tu Fee, falling over a perpendicular lava-wall into the bay. This stream I followed a number of miles into the interior during the dry season, and found the volume of water nearly double that of the stream at Apia, Upolu.

Another stream equal to that of Apia debouches into the bay of Salotea near Palouli, for several miles running through a level stretch of country. The bays into which these streams flow have a reef across the entrance, rendering the passage for boats very dangerous, and the shallow waters being shallow may account for the omission alluded to on the part of an officer who was generally so precise.

At Matautu there is an open bay of considerable extent, with reefs on either side, the opening broad and deep, the anchorage good, and four-fifths of the year would be secure, at all times safe against the sailing trades, but in a northerly a vessel, however well found in rig and tackle, would be driven ashore, as it would be nearly impossible to reach the open sea.

At Asau, twenty miles east of Matautu, is a broad, deep bay, fronting four miles of the coast from Asou to Fagaso, with an average width over one mile, with considerable depth of water, the entire inner waters protected by a lateral reef of great width and generally exposed at low tide; this is at all times a sea-barrier, though the extent of the reef gives room for a considerable swell. There are three openings or breaches through this reef, neither sufficiently large for vessels, though the eastern passage at little expense could be sufficiently enlarged for practical purposes.

Excepting these, there is not a bay or lagoon on the island that any vessel other than a whale-boat or native canoe can find shelter in. The north side of the island is fronted by an outlying coral reef, at the base of which high lava-banks projecting, broken and lashed by the waves.

Upon the northwest coast, four miles from the extreme western end of the island is the largest village in Samoa, *Falealupo*, situated upon a sandy plain. The white-sand beach is protected by low coral reefs, and a narrow boat-passages. The village is located in a deep cocoa-nut grove. This is one of the most important stations of the London Mis-

sionary Society, with a capacious church, school-houses, and quite imposing missionary dwelling-house. The district is in charge of Rev. Dr. Davis. Four miles west, and near *Tufu*, a broken lava point stretches into the ocean; this is the extreme leeward end of Savaii a Samoa, in latitude $13^{\circ} 31'$ south, longitude $172^{\circ} 48'$ west, the *Hades* to the Samoans, where the spirits of the dead precipitate themselves into the boiling caverns amid the sea-washed rocks.

The country across the point from Falealupo to Neiafu, on the south coast, is gently rolling, heavily timbered in most places, some cleared and many groves of bread-fruit.

In this section of country tobacco and ava are quite extensively cultivated.

The south shore is a bold sea-front, with long, narrow lava flats and vertical sea-walls, or high plateaus, the only approach to the villages being through narrow passages in the basalt-rock. These openings are dangerous to any but native crafts and crews. The shore-line is almost a continuous village; a pathway connecting them is paved with smooth stones, the building of which the natives have no tradition of.

Many of the villages are perched high on the plateaus overlooking the ocean, the inhabitants being better skilled in wood-craft, if possible, than in the management of the canoe.

While the mountains rise rapidly from the south coast, yet they are nowhere inaccessible, with few deep ravines and no naked cliffs. The general aspect is more inviting than that of the south side of Upolu.

Satupaita, a large village on the bay of the same name, is a station of the Wesleyan society, represented by Rev. Mr. Wallace. Here the mountains recede, leaving a large extent of nearly level country, exceedingly rich in soil and heavily timbered.

From *Agonoa* to *Saleaula*, comprising the eastern end of the island and looking toward Manono and Upolu, the country is uninviting.

In many places the table-lands are naked lava, with a bold, iron-bound coast.

Saleaula, upon the northeastern part of the island, is fronted by sand-beach three miles east of the Bay of Matautu, the back country nearly level for several miles, covered with a dense forest. Under this tract of land is the system of caves before mentioned. From the village across the lowlands runs one of the ancient Savaii roads, the whole built of heavy stones filled between with broken stones and earth, the surface smooth and dry and from 10 to 15 feet in width.

Saleaula is the present residence of Rev. George Brown, senior Wesleyan missionary in the group, and Wesleyan bishop of Polynesia. With him I went round Savaii in open boats, made many land-journeys between points and across the island. To this most excellent gentleman I am indebted for much information as well as courtesy.

Savaii, unlike Upolu, is not divided into great districts, but is governed by petty chiefs of villages.

The northern portion of the island is called *La Itutane*, (the male warrior side,) the south side *La Itu Fa biné*, (woman side,) always ally of Manono.

Accompanying document marked O is a list of the names of villages while maps enlarged from Wilkes's surveys give the location of each village.

From data at hand topographical maps upon a large scale could be prepared at the Coast-Survey Office and lithographed.

Paintings in water-colors with coast-lines are truthful, but especially attention has been given by the artist to the Bay of Pagopago.

To present a minute and faithful physical description of the islands, an exhibition of their commercial status and relations, and exact and intelligible statement of their crude and incoherent political system, with a somewhat full account of the social, domestic, and religious characteristics of the people, with the few facilities at hand for such a work, I have found to involve no small amount of time, care, and labor. But I have done the best possible under the circumstances, reserving the history of my business and official intercourse with the natives until after I had given such a view of Samoa.

On Thursday morning, August 17, anchored in the harbor of Pagopago, with Pagopago flag and our ensign flying. In a few minutes our vessel was crowded with natives, among them one who could speak a little English, John Sine, an intelligent but knavish fellow, really the hereditary chief of the bay, educated by Rev. Dr. Powell.

The following day I dispatched a boat to the village of Pagopago, at the head of the bay, with a message to Mauga, the chief. At 3 o'clock he received me in the town-house; his wife, a young daughter, a sub-chief, the interpreter, and my artist present. I found him filled with an exaggerated view of his importance, position, and security.

Pointing to the flag flying in front of his house he said that he controlled the region about him, and that he was secure in the protection of "Amerika." I told him that I had come from America to visit the island and learn all that was possible of Samoa—that there was a kindly feeling upon the part of our great Government toward his people.

The following day Mauga, with wife and child, dined with me in the cabin of the *Fanny*, the decks being filled with natives. The chief's family were in European clothes and exhibited no little dignity and propriety. Mauga, however, soon developed a characteristic disposition for gain, asking for pilotage and harbor dues. In this I foresaw trouble to himself and people and appointed the next day for a council at his house, with the pilot and some of his chiefs, when I read a printed copy of the harbor-regulations made for him by Commodore R. W. Meade. These regulations provided for harbor-commissioners, consisting of Mauga, the agent of the Australian Steamship Company, and a foreign consul; this commission to fix rates. There being no agent of said company or foreign consul in the bay, and Mauga not fairly comprehending such a paper, was apt to exercise arbitrary rule, claiming United States protection or even authority.

I entered the harbor without pilot, the pilot living some miles distant, upon the island of Anuu, and found that the buoy which Commodore Meade had put upon Whale Rock was gone, and no facilities provided for water.

I made an appendix to the harbor-regulations, and secured the official indorsement of the English consul at Apia; (see accompanying documents, marked L 1 and L 2;) and that he might the better understand, I paid the pilot full charges and the harbor-dues at the rates mentioned in the appendix, taking receipts and leaving him blank forms of receipts.

I also had a metal seal made for him, receiving from him a pledge that he would buoy the harbor, and open a boat-passage at the upper end of the bay to the small stream, thus giving facilities for ships in the harbor to take fresh water as compensation for harbor-dues. These promises were not fulfilled, and in a short time after my departure he seized a boat belonging to the English schooner *Dauntless*, demanding an unlawful sum of money as harbor-dues, which was paid. The captain made complaint to the English consul at Apia, and a heavy fine would have been imposed, but on my personal intercession, Mr.

Williams remitted the fine, and I refunded to the captain the money paid over, 3 cents per ton. I did this to get a practical recognition of Commodore Meade's action. Whatever may be the avarice and ignorance of Mauga or his farcical estimate of the importance to himself Commodore Meade's treaty, yet that treaty and the harbor-regulation with the intelligent and dignified action of this officer, gave to the United States a powerful influence, made a lodgment among a people without a fixed government, attracted and attached all the natives to us, and compelled upon the part of foreigners a tacit acknowledgment of the priority of America in its right to treat with the Samoans.

At Pagopago I was not long in discovering that Mauga was not hereditary chief—that the chiefs upon the leeward end of the island were more important, and that Mauga's petty tyranny within a year was making his people restive; that the imposition of fines was mainly to secure to himself the money penalty, as well as being a willful perversion of the treaty and harbor-regulations.

In Pagopago I first learned of the virtues and Christian attributes of the natives. Coins, jewelry, knives, and other things might be upon the deck of our vessel, hundreds of natives might come and go, yet not an article of value would be touched.

On Sunday the villages were singularly quiet. I therefore established a rigid discipline on board the vessel, having a motley crew; Scotch captain, mate a Swede, the sailors Russians, Finns, and Swedes, and a painter a Bostonian.

On Sunday work ceased, the crew, well dressed, went to church, and throughout my intercourse with the natives and missionaries, the sailors preserved a commendable decorum, on Sundays attending church and observing religious forms at household prayers.

On August 15th I left Pagopago for Apia, Upolu, landed at Anu'u where I explored the island and had a long interview with Faumuia, the chief, who expressed his dislike of Mauga as well as his earnest hope that Samoa would establish a government, or that the United States would take them under her wing. He was a mild, quiet, and intelligent man, having the interest and happiness of his people at heart. Leaving Anu'u, and passing through the channel, we rounded the eastern point of Tutuila, stopped at points on the north coast, and arrived at Apia on the 17th. From this port I made most of my journeys and explorations in open boats and by land travel with natives and missionaries.

Mr. Coe, the American commercial agent, was absent upon a visit to San Francisco. I sought Mr. Williams, the English consul, whom I found to be an intelligent gentleman, the son of the martyr missionary and born in Samoa, created a chief by the natives, and endeared to them as a mild, just man, and thoroughly conversant with their language, having the welfare of the people at heart. I briefly stated the object of my visit and my desires, to which he lent his hearty co-operation. I found that the great chiefs of Upolu, Manono, and Savaii were congregated together at Mulinu'u, below the town, for the purpose of making laws and establishing a stable government for the whole group.

On the morning of the 19th, by appointment, I met the assembled chiefs at the house of Mr. Collie, Mr. Williams acting interpreter. Much time was occupied in the interchange of compliments, when I told them that the purpose of my mission was to gather information of the islands, and their inhabitants; that I was not clothed with diplomatic power to treat with them; that I had come from a great nation in a small unarmed vessel; that my desire was to meet and confer with

them; that I was accredited to Samoa and the Samoans, not to the white foreign residents; that I was aware of the fact that they now felt keenly the transfer of lands to the whites which was the result of their own tribal feuds, and the advantage taken of their necessities; and that the prime minister of America had instructed me to advise the natives against the sale of land to foreigners. I assured them of the kindly feeling of our Government, and the interest taken in them; and that in my journeyings I should mingle with them, shrinking from no hardships, and would ever be earnest in my efforts to learn with and from them.

At this council were grave and dignified chiefs, who, a few months before, were enemies in war. From that day till the hour of my departure from the islands the chieftains would seek me, asking advice, and detailing their plans for the creation of government and establishment of laws.

For the first time they felt they had met a white man other than missionaries, who advised them against the sale of their land and mingled freely with them without sinister motives. The feeling became diffused throughout the islands, and the "Alie Amerika" came to be known as their friend. Pages of specific instructions could not have evinced greater forethought or accomplished more by the Secretary of State than the one sentence, "Advise the natives against the sale of property." It was at once a pathway to their confidence.

I found in Pagopago and Apia the representatives of the "Polynesian Land Company." Of the originators of this scheme of speculation in these islands, I know but little, and that little not creditable to their antecedents nor their more recent acts in connection with it.

The San Francisco stockholders and one James McKee, of Sandwich Islands, are certainly innocent and highly respectable gentlemen, whose money has been squandered and their reputation stained by adventurers representing them on the islands. Trading-posts were established by the company at Pagopago and Apia, and large tracts of land purchased from the natives during the war, arms and ammunition given to the belligerents in trade for valuable property—a far-off cousin giving a deed for land belonging to the family with whom he was at war; contracts were made for immense tracts of land at nominal prices, a paltry sum in guns and powder and lead being paid as a bonus, the remainder to be paid in two years.

Happily this period has elapsed, the money not paid, and the contracts consequently lapsed.

The native combatants came to realize that they were the objects of common plunder, and made peace with each other.

After my conference, the whites sent me an address, (accompanying document marked C 1), an answer to which I delayed until just previous to my final departure. (Document marked C 2.)

The foreign residents repeatedly called on me to know what would be my advice to the natives with regard to land-sales. I could not but tell them that I thought the Samoans had been imposed upon, but that land-titles must be a matter for future investigation by recognized and legal tribunals, and that I could not assume to arbitrate upon any specific question.

I found myself in an anomalous position, and determined to avoid issues, but adhere to the natives.

On the 23d August I received a message from the chiefs, asking "a talk" on the following day, and met them again on the morning of the 24th.

There was a large number of prominent chiefs present. The govern-

ment's "talking mau," Prime Minister Tupai, of Atua, delivered a lengthy address, recapitulating the history of the war, expressing the desire for the permanent peace, commenting upon the loss of their land, their helpless positions if foreigners should unjustly demand fines, and that an English or German war-vessel should come to collect, and closed with an earnest prayer that "Amerika" would extend its protection over them and instruct them in law-making.

Tupai was followed by Saga, a chief of Liulemoega, Upolu, a tall, gray-haired man, who, upon the part of Samoa, presented to me the government "staff" and "fly-flap," representing the unity of all the people, saying that they sent them to "Amerika" as pledges of their desire to be ruled by that great Government; that these were the recognized symbols of the people and their language; that the great chiefs in council had determined upon this, and there was not a dissenting voice. Upolu, Manono, and Savaii; also that in one week every Samoan would know that the emblems of their nationality had passed into the hands of "Amerika." These emblems I bring to Washington. I received them as a custodian of the Government; told the chiefs that my labors among them had just begun; that I would traverse the island, and visit Manono at once. They assured me of their aid, but wished me to be present at *Mulinuu* at the great "*Fono*" on the 27th, that was an occasion of great rejoicing—it was peace for Samoa.

The Atua, Manono, and Savaii chiefs and warriors at *Mulinuu* (Tuamasaga ground) were to be fed and entertained by the Tuamasaga Aana people. The guests were seated in a large, deep circle, with an opening toward Apia. Soon the long files of the Tuamasaga began to approach through the cocoa-nut groves, singing Christian hymns, warriors in gorgeous head-dress of blonde human hair, preceded by a "talking man," who assigned them places; these were followed by others bearing live and roasted pigs and poultry; then followed the lines of young girls chanting, all in native dress of "fine mats" "*siapo*," with wreaths and flowers in their hair, each bearing fruit, yams, and taro.

It seemed as though the whole population had poured out. Processions in great piles surrounded them; speeches were made, and peace reigned in Samoa.

On the 28th I went to Manono in open boat, with Rev. George Brown and natives; had a long conference with the chiefs—*Leiataua*; addressed the natives in church, and rendered myself generally familiar with the people; visited *Apolima*, and found the same uniform disposition of natives, all subservient to the action of their great chiefs.

On the 1st of September returned to Apia, where I made journeys to the east and into the interior.

On the 5th sailed for Savaii, landed at *Matautu*, and walked to *Saulo*, Mr. Brown's residence, where I made headquarters for several days.

On the 10th went in open boat to *Asau*, after having sent my vessel back to Apia and *Pagopago*, with instructions to meet me at *Satupaia*, on the south shore, about the 22d.

I went round the island; penetrated into the interior; met the people and chiefs in church, in school, and in council.

Here I found the natives more primitive, but all Christians, hospitable, and unanimous in their desire for a stable government.

After spending nearly one month in Savaii I returned to Apia, taking some of the chiefs with me.

On the night of the 28th I met the native teachers of Rev. Dr. Turner's district (*Tua Masaga*) at his house, where I had a very protracted

new with them, and from whom I learned much of the social relations and prejudices of the Samoans.

I had lived in the houses of the teachers in Savaii, but still I had but a perfect conception of the pride of caste among the great families of the people.

These teachers of Dr. Turner asked an interview, because they had heard of my intercourse with their brother teachers in Savaii. I begged them they would talk unreservedly; said that I had come to see all sides of the people, and was equally interested in all.

With no little shame they told me of the inferior position which they held, that the great chiefs would seldom send their children to school with them, and, though protected by law, they were common people.

I parted from them promising to speak to the chiefs in their favor. I did at the next council.

The missionaries predicted an utter failure upon my part in this direction.

I approached the question at once in council; informed the assembled chiefs that I had spent hours with these teachers; that I had treated the pride which prevented chiefs from recognizing them; that the time would come when these people, who were intelligent and brave, would exercise an important influence in their country, and that they were the educators of their children. I pictured America, where all people were equal under the law, and goodness and merit gave distinction.

Without awaiting an answer I asked them for an evidence of their confidence and trust in myself; and then I wanted the great chiefs to meet me and shake hand with the teachers. They did it, and assured me that they "had turned their backs upon the past."

The feeling and gratitude of the teachers is evinced in their note to me with presents. (Document marked H 1.)

At this time the government was busily engaged in forming a code of laws, gathering their information from the Huahine laws of Tahiti, Tonga, and adapting them to their own necessities. They were presented to me in a crude form, when I called the English, acting American, and German consuls together; also the Protestant and Catholic missionaries; and, after consultation, the laws were revised and returned to the chiefs. In this I had no little difficulty, for the German consul and other white residents had been purchasers of land, and demanded that all past land-sales should be ratified by the government, debarring future investigation. This was too palpably unjust; and, coming from a consciousness of non-validity of title, I could not accede to it.

These laws are perhaps ineffective as are these laws, yet they are a step in the right direction and evince the desire of the people. Copies of the constitution and laws are among accompanying documents, marked E and G.

On the 2d day of October the Samoan flag was raised at Mulinu'u and was fully recognized by foreign consuls. The flag-staff was in front of the government-house, the chiefs and people making a circle around it.

At 2 o'clock p. m., Patioli, the *Tui Masaga*, magistrate for Apia, raised the flag; a few iron guns saluted it, and the national ensigns of the shipping in the harbor and at the consular residences were hoisted. With the missionaries and foreign representatives on either side I saluted the flag and addressed the people. Previous to this ceremony, I was much concerned to know what would be the action of the German consul. While our relations were of the most agreeable

character, yet, knowing his control of a great monopoly, I had doubts about his recognition of the Samoan government and their laws; hence I was the more gratified to have him present and all his vessels displaying national bunting. I felt that I was not only eminently successful, but that every element was harmonized.

On the following day, with Rev. Dr. Turner, I visited Malietoa, two miles above Apia, where he is living in retirement with his aunt, Patocino, (Emma.) He is a young man, educated by the missionaries, preferring retirement to politics, ambition, and strife—his great name a sure protection.

He expressed his great joy that peace had come, and laws were created for his people; he was earnest in his desires for American jurisdiction; he knew much of our country, our civil war, the freedom of the negroes, and our paternal care of the Indians.

He and Emma accepted an invitation to dine with me on the following day. Knowing that this would be the subject of general comment among the chiefs and the heads of the government, I sent for Tupai, told him of my visit to Malietoa, and requested that he would visit me the next day. I assured him that it was a compliment to all Samoans to visit their greatest chief; that jealousies must cease, and Samoa would be blessed; and that I wished to be the first person to tell the Atua chiefs of my visit to Malietoa.

Tupai appreciated this, but said it would also be politic to make a special call upon the Atua chiefs. This I was pleased to do, and we fixed upon the second day after at the Atua headquarters in Matautu, he promising to send to Atua for the principal chiefs.

On the 4th, Malietoa, his wife, and Emma were received on board the Fanny, with Rev. George A. Turner, and spent two hours, parting with interchanges of feeling expressions; Malietoa saying he would send me a letter for the President of the United States. (Accompanying document, marked E.)

On the morning of the 5th I went to the Atua house and found a number of the chiefs present with Tupai. Much of the day was agreeably spent with them. I found that petty jealousy was rapidly melting away, and prejudice yielding to an earnest desire for peace, laws, government, and the aid of America. Atua had anticipated this meeting. At home they had held councils and finally concluded to present to me the great sacred mat of Tui Atua, a piece of cloth held in great reverence by them, older than their history, known to most of the other islanders of the Pacific, having the power of life and death, and which would ransom their nation. Within the mat is its history and description written by themselves and translated. With much ceremony it was presented by Tupai in a lengthy address. I placed it upon my head (Samoan etiquette) and made answer to them. This was followed by an unreserved "talk" in which I gained no little information.

They expressed their gratification that I did not fly the Pagopago flag out of that bay, saying that it was well known to all Samoans that Atua owned the island of Tutuila, and in the government, Atua spoke for Tutuila. I explained that I carried the Pagopago flag from respect to a local chief, but particularly as a recognition of the acts of a great and wise naval commander of the United States. Here, as everywhere, I found hostility to Manga, though the great respect of the people for America prevented any interference with him. They were particularly concerned for my safety, having this mat and going to Pagopago, and wished to send even one Atua chief with me, which would be ample protection; but this I declined, and counseled a more enlightened policy,

advised that they send a deputation to Tutuila, with invitations to their best men to the government house at Mulinu. This they agreed upon, and expressed great good feeling toward Tuiteli, Sateli, and Tuli, chiefs of the western end of Tutuila; Leatu, of the eastern end of the island, being an Atua chief, and present. It was useless to discuss Manga with them. I parted with Atua as from an old friend, and shall ever revert to this meeting with pleasurable feelings. On the 6th, accompanied by the foreign consular boats, with flags flying, I went to Mulinu for a final interview with the representatives of Samoa, the Atua and Pule," the government. The great chiefs were also present. An armed guard surrounded the house. The Protestant and Roman Catholic missionaries were present, who had never before mingled in public. The two religious sects had never before met. The constitution of Samoa, which no white man had seen, was for the first time made a copy of which, with the laws, was handed me, with translation and explanation. The laws, after the Samoans had remodified them, were read, and criticisms invited from the whites. It was a trying time. The natives had made great sacrifices, destroyed traditions and time-honored customs, and made heavy penalties for transgression of the laws, these applicable to themselves; only hence they looked to me for indorsement of those wherein these might be in conflict with the whites. When section 1, "law for selling land," was read, it was at once opposed by the American consul and agent of Goddefray & Co., and our acting commercial agent, Mr. Hamilton. They wished a clause inserted which would forbid the debar investigation into past land-sales, and that the titles be confirmed. The missionaries, ever looking to the interests of the people, and timid in their intercourse with the whites, dreaded a serious disagreement. I at once insisted that the law should be accepted, and opposed no amendment or modification; and was compelled to say to Mr. Hamilton that he was "creating unpleasant conclusions in my mind." This was a single extra-official and arbitrary act upon my part during my interview with the Samoans. There was, however, an oral agreement that land-sales should remain *in statu quo*, for, say, one year, when an appointed board of commissioners might adjudicate upon them. After the meeting was harmonious.

I gave my address, the translation read by Rev. George A. Turner. (Accompanying document marked D 2.)

The government secretary read the letter of the "Taimua and Pule" to the President of the United States, which, with translation, was handed to me. (Accompanying document D 1.) I told the government chiefs and chiefs that I had no power to treat with them; that my intentions were to gather facts and report the same, and that this I could do faithfully to do, but that I had no pledges upon the part of my government to make; and our meeting ended.

The following morning, October 7, I sailed from Apia homeward-bound, having received letters from Rev. George A. Turner, marked I 1; from Rev. S. J. Whitmer, president, and Rev. G. A. Turner, secretary of the London Missionary Society, marked I 2; from † L. Elloy, Roman Catholic bishop, marked I 3; from Rev. George Brown, Wesleyan, marked I 4.

On the 8th, landed at Leone Tutuila, sending vessel to Pagopago, and, Mr. Meredith, United States vice-commercial agent, (a creditable agent of the Government,) visited Tuiteli and Sateli, with whom I had interviews. They were waiting to receive the Government emissaries, and expressed their joy at the establishment of a government. I assured me of their hearty co-operation. The articles of confederation

tion (document marked K) they had refused to sign, having no aff with Mauga, and were unable to act without the sanction of Atua.

I found these chiefs prudent, sensible men, with whom I spent time, and, leaving them, visited the different villages *en route* to Pago Pago on foot. The following night, at a late hour, reached the island and found Mauga on board my vessel awaiting me, and unable to control his anxiety to know of my intercourse with the Tutuila chiefs at the leeward end of the island. I could get from him no satisfactory explanation of his outrage upon the English schooner Dauntless, but he profuse in his apologies. He had not buoyed the harbor nor opened the boat-passage for water. He begged that I would do this work for him. Finally, with the pilot, we arranged for this work, and there was reasonable hope that it will be done.

The object of Mauga's patient waiting was a desire to see the "Atua mat," to which I could not accede. Our friendly relations, however, were not disturbed. The following day I met Mauga and some of the council; gave them a history of the government at Mulinuu, and expressed a desire for unity and concord among all Samoans.

With these people I found the same desire for peace and hopes of a better future, but all talk drifted to one point, a determination to see the "Atua mat." I tried to convince them that I had no right to exclaim "Atua mat." I read my address to Mauga, (document marked A 2,) and received his letter to the President, (document marked A 1.) After the exchange of a few presents and a general hand-shaking, we parted with kind feelings.

The next morning weighed anchor and sailed for Manua; landed at the 12th at the village of Tau-Nanua, where I found the teacher of English, and with him met Tui-Manua that day.

I found the king to be a blind old man of eighty or more years, with long white hair long and white as snow. His people stood around, their faces expressive of awe and pity. But few white people come to Manua, except the missionaries, and they only at long intervals. The natives were thoroughly Christianized, the little island so isolated and being without a harbor, that they were secure in their faith. The old king had himself informed of all matters in the large islands, and welcomed me with sincere pleasure. For an hour he held both of my hands, talked to me of government, of law, of peace, Christianity, and his love for the Samoan people. Even this exertion was rapidly exhausting him, and he bade him farewell. In an hour he sent me the "Tui Manua mat." The next day I left Manua and Samoa. The Samoan government consists of the "Taimua and Pule," the former comprising seven chiefs, not among the greatest, but known for their ability; the "Pule," four chiefs of higher grade, who crown the edifice. The *Taimua* and *Pule* appoint legal magistrates for districts from among the people over whom they are to have jurisdiction.

The government is to be sustained by a *per-capita* tax. With the resources this will be trifling, and cheerfully paid. But they know nothing of finances, or the art of government; in theory they may play some wisdom, but they must fail in practice. They fully recognize that some government must aid them.

With a population about one-third less than the Hawaiian Islands, with vastly greater natural resources, and amiable and tractable people, upon the track of a growing trade between English-speaking people and Samoa, under guidance and protection, would develop and concentrate a great trade. To the touch of industry, its harbors would be l

, its timber utilized, and its valleys and mountain-slopes teeming with native products.

Without needless amplification or argument I have, in this paper, endeavored faithfully to picture Samoa; and now

I have the honor to be, your very obedient servant,
A. B. STEINBERGER,
United States Special Agent.

H. HAMILTON FISH,
Secretary of State, Washington, D. C.

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[Inclosure A 1.]

PAGOPAGO, August 15, 1873.

Excellency the President of the United States:

It please your excellency to receive greetings from a native chieftain whose resources are few, and whose resources are less.

We have come to know your excellency as a great chief, over many chiefs and over many people. Your people have met us as friends. They have come among us as friends, bringing greetings from their great chief, and our hearts are warm with friendship.

At our home (Pagopago) we are Christian, worshipping your God. The good teachers have taught us to be honest, observe your doctrine, and maintain the faith.

We know that you are a great people, with many ships and many warriors, but that you are all united in peace; that you cultivate the soil, build great houses, make great roads, and talk to each other through the air. We want the same, and pray for the protection, and friendship of the President of the United States.

Our men-of-war and your people's vessels have come into our harbor. We have made agreements with them, and your flag is joined to ours. We gave to you everything right to our harbor, and we want you to use it.

We are poor, but we are happy in our peaceful island. Our Samoan brethren in other islands are divided, and their hands raised against each other. We all

want peace; we want unity and laws, and beg you to come and instruct us in commerce and law-making, extending to us the protection of your excellency's great Government. This will ever be the prayer of the Samoan people.

I send kindly words of greeting, and extend my hand to your excellency.

MAUGA,
Chief of Papagago

I hereby certify that I have duly attached the original and translation, and also it be a true and correct translation of same.

T. MEREDITH,
United States Vice-Commercial Agent

[Inclosure A 2.]

PAGOPAGO, August 10, 1898

To the Great Chief of Papagago, greeting :

I have come over many miles of land and water from the Great Chief of the United States of America to offer you a friendly hand in the name of our people.

Commander Meade, with one of our great war-ships, has made a treaty with you and you have given us the right to your beautiful harbor. Commander Meade has made for you a flag and hoisted our own, believing that at no distant day your harbor would afford refuge to our vessels, and create such general commerce and commercial relations as would more nearly bring the Samoan and the American into close relations and bonds of fellowship.

I have come among you to explore your islands, look at the rich and varied vegetation, know of your manners and customs, meet your great chiefs, see the evidence of your Christianity, and learn of your desire for closer connection and intercourse with the white man. I shall carry home to our Great Chief a truthful picture in my mind of your beautiful bay, your fertile lands, soft climate, and the fruits and vegetables which the good God has given you without asking and without labor.

Nothing that I have seen among you has impressed me more, or will better please our Great Chief, than the Christian character of the people you rule over. The missionaries have brought to you the word of the true God, and you have taken it to your hearts. I will tell my chief of your faith and honesty; how my ship has been filled with Samoans, (men, women, and children,) our valuable articles spread about and not even a nail missing; how, when your Sunday comes, all is quiet, and each man goes to the house of God; but I will be more happy to tell of the virtue of your women.

With a heart full of feeling, great chief, for you and for your people, I must tell you of things which you do not do. Your lands are not tilled, your people do not work, the art of industry is not fixed among you, and your people are not clothed. In your country we till the soil, our great fields are spread everywhere, families labor together, and our nakedness is covered.

Your people are not afraid of work; your young men are brave and active; they have gone with me through the bush, and climbed to the top of high mountains; have paddled my canoe when our white people would sicken.

Your religion teaches you industry as well as devotion; your people love you, and you can do much for them; my Government and people will not forget you in their efforts.

I have been in Upolu, among your brethren, and there find them poorer than we are, and not so steadfast in their goodness. This has come from war, where chiefs and families have engaged in ugly strife, and a beautiful country is suffering for want of unity, concord, and law. In Upolu in Apia that the white people are your friends, that the great chiefs want peace and will begin to adopt laws. I have tried to help them, and will do more before I leave you.

In our country we have many tribes of natives, but they are not so peaceable and honest as yourselves; only a few are Christians; but it is cold in winter; they give them but little, (you have everything,) but my Government gives them land, farmers, tools, teachers, clothing, and provisions, and makes laws for them. Some tribes are rich and happy, but they have made farms, built churches and school-houses, and live as their white brethren.

My Government or people do not want your lands; we want to aid you. My Great Chief told me to advise you not to sell your lands "to individual foreigners;" we want you part with it you lose your mother who maintains you, and who will always support you. Of this I have in our talks cautioned you so much that you will believe in our kindly interest in you.

In the harbor regulations made for you by Commander Meade, he did not provide

presence of harbor commissioner, or fix regular harbor-dues. This I have done
 in, making the amount three cents per ton. I have paid you this small sum to
 establish the precedent, but you cannot expect to collect dues from vessels unless you
 and buoy your harbor. I have instructed you in this, and your pilot will bring
 the chain given by Commander Meade to fasten the big buoy in place.
 My great chief, in saying farewell, I will again express my hopes for the welfare
 of your people, and prayers for your life and happiness.
 I am, truly, your friend,

A. B. STEINBERGER,
United States Special Commissioner to Samoa.

[Inclosure B 1.]

APIA, August 19, 1873.

great Samoan chiefs and rulers, greeting :

I have come from the Great Chief of the United States to visit your islands, see your
 chiefs, and talk to your high chiefs. I bring from a great Government greeting and
 words of fellowship.

Now you will have a great meeting to-morrow, and I send to ask if some of you
 will meet me at the consulate, or appoint a day and place when I shall come among

to salute you in the name of our people and Great Chief.

Fraternally,

A. B. STEINBERGER,
United States Special Commissioner to Samoa.

[Inclosure B 2.]

GOVERNMENT HOUSE OF SAMOA,
 August 21, 1873.

Chief from the American Government :

Your letter is from the government of Samoa to your excellency.

In answer to your letter expressing your wish to confer with some of the chiefs and

we will now appoint chiefs and rulers to wait on you on Monday, at 9 o'clock.

Again, let us meet at Mr. Collie's house; and we wish you to ask Mr. Williams

our interpreter in the Samoan and English languages.

It is all. May we all have God's blessing.

Are the rulers and chiefs of the Samoan government.

Your letter was written on the 22d, and received on the evening of the same day.

[Inclosure C 1.]

NAVIGATOR'S ISLANDS,
 Apia, August 19, 1873.

On the assumption that you have been delegated by the President of the United
 States of America to visit these islands in answer to a petition signed in April, 1872,
 by a large and influential majority of high chiefs and rulers, praying that the protec-
 tion of the United States of America be extended to this group of islands, we, the
 undersigned foreigners, residents in these islands, holding as we do a majority of in-
 fluence, and deprecating the prolonged and the ever-recurring civil wars, subversive
 of morality and religion, and seriously impeding the material advancement of the
 island group, approach you with the expression of our hope that the prayer of the
 petitioners may be granted by the President and Government of the United States.
 On our own behalf and on behalf of the petitioners we respectfully request your fa-
 vorable consideration of the prayer of the petition. Since the cessation of late hostil-
 ities attempts have been made by the chiefs of the two opposite factions to frame a
 code of laws. Although deeply sensible of the importance to themselves, and well
 that wholesome laws will tend to the progressive improvement of their country,
 the petitioners have found themselves unequal to the performance of legislative duties in
 framing such a code of laws as will prevent civil strife and of involving them in trouble
 from foreign powers. It is not incompatible with the welfare of both races that

whites and natives should live side by side and in amity with each other; but to duce to and insure this desirable and practicable end it is necessary that a sound of laws should be established for the government of natives and whites irrespec of rank or condition of both races. Humbly praying that it may be consistent your high duties to give the spirit of our request your favorable consideration and ther the attainment of our object,

We have the honor to remain, sir, your obedient servants,

[Here follows a number of signature

Colonel STEINBERGER,
United States Commissioner.

[Inclosure C 2.]

APIA, SAMOA, October 6, 18

GENTLEMEN: I have read with more than ordinary interest the document bearing your signatures of August 19.

I have delayed a specific answer until such time as might enable me to see Samoa and the Samoans.

Now, upon the eve of my departure, I am proud to say that I have learned no of the character of the Samoans. I have traversed the islands, seen their internal domestic homes and relations. I have read their laws, which you yourselves pronounced correct in intention, and modified after the Samoans have submitted to you.

You, gentlemen, nursed in religion and civilization, will appreciate that an aboriginal people, struggling for light and prone by habit to make no distinction in their intercourse with the whites, will have many difficulties to overcome. Charity and the better elements of manhood will prompt you to give to them the aid and comfort which your civilization and knowledge of law and its observance suggest.

I am deeply sensible of the necessity for law and an established government upon these islands. I regard it as being necessary for the salvation of the Samoans some government extend to them power and protection. My feelings and sentiments are the more enlisted from association with the natives, on observance of their sincerity, their honest intention, and the deep religious sentiment which absorbs them; this I recognize the great labors of the missionaries, their devotion and their sacrifice and the earnest devotedness of the natives to their teachings. For this let us thank the good God.

Your petition I will present to our Government of the United States. I will close with me your hopes; your prayer will be in my mind and heart.

I leave you and Samoa with regret, with all charity and love, and thank God for the great unity of sentiment pervading all races and color in these islands.

I have the honor to be, gentlemen, your very obedient servant,

A. B. STEINBERGER,

United States Special Commissioner to Samoa.

Messrs. WILLIAMS, COLLIE, TURNER, DEANE, BARNARD, PARKER, BLACKWOOD, and others, *Apia, Samoa.*

[Inclosure D 1.—Translation.]

THE HOUSE OF THE GOVERNMENT OF SAMOA,
at Mulinuu, October 3, 18

To the Principal Chief of the American Government:

This is our letter to your excellency.

We are the rulers of the government of Samoa. We send a great deal of love to your excellency.

Although we are not acquainted with one another, and have not met face to face nor talked with one another since the world was created, yet we write this letter in order that we may meet with one another, because, though we are very far apart, we shall meet for the first time and talk with one another at the hour on which we receive this letter and look at it.

Now, we are going to make known some facts to your excellency. Formerly there was war in this our land of Samoa. It was very bad indeed, and the people were of different minds at that time. Now it has been brought to an end. The chiefs and rulers of Samoa are all of one mind, and laws have been set up for the government.

the harmony and the laws were established on the 1st of May, 1873. We also
 a flag as a symbol of the government of Samoa on the 2d October, 1873.
 yet, notwithstanding that we have set up laws for the government of Samoa,
 though the body is whole, but it is only lying on the ground; it has no living
 in it. As is the story in the Bible: God made man, then the body was whole,
 was only a lying down, there was no living health in it. Then God breathed
 it, and that is the cause of its moving about and being alive. In the same way
 a and the laws are the person. We are exceeding desirous that you should
 be into Samoa. Be pleased to bring your wisdom, and the goodness and beauty
 the American Government to teach our government, and to aid Samoa in the mat-
 laws.

have shown the details of our government to the chief that came from the Ameri-
 government, Colonel Steinberger. He will let your excellency and the American
 nment know all about it.

also know the object for which he was appointed, and the reason for which he
 to Samoa; that is, the union between the government of Samoa and America.
 ery much desire that affair to be confirmed.

ef, we are now going to make known to you our wish. Our desire is very exceed-
 great indeed that that chief, Colonel Steinberger, return to Samoa, because we
 become acquainted with him during the short time he has been in Samoa. And
 er reason for this desire is that we know well the peacefulness and the amiability
 at gentleman is truly marvelous.

pleased not to delay an answer to this our desire which we are presenting to
 excellency.

at is all. May your excellency have health and strength, and may the American
 nment be blessed.

are the chiefs and rulers of the government of Samoa.

[Here follow signatures.]

UNITED STATES COMMERCIAL AGENCY,
Apia, October 7, 1873.

ereby certify that the within writing in English is a true and correct translation
 herewith-attached writing in the Samoan language.

E. L. HAMILTON,
United States Vice-Commercial Agent.

[Inclosure D 2.]

Samoa chiefs now at Apia, October 1, 1873, greeting:

en I came among you I had nothing but my own discernment to guide me; my
 countrymen I do not consult. I have sought your friends, we have met, and our
 ings have been friendly. I come with greeting, and the earnest friendship of our
 e and my Great Chief.

ave spoken the views of my chiefs. I have counseled you as to your interests,
 ed you against the sale of lands, deprecated recognition of liquor-shops, and told
 f the industry of our people.

ave found you to be a brave, earnest, and honest people; you tell me that you are
 ple people, and that you believe in my people, and hope for guidance from them.
 carry this in my heart and my mind; my Great Chief shall see you all through

ave the old symbolical evidences of your sincerity and esteem; I know how to
 sh them; they shall occupy a permanent place in the great building of our chiefs.
 children shall look upon them, and return with pride to you.

ay for your peaceable maintenance of laws, the cultivation of friendly relations
 your white brethren, and a religious observance of such correct attributes as will
 ecore your freedom and integrity.

people are powerful; you are few, but you are great in all the good which a kind
 as given to you.

ave read your laws, advised with the representatives of other governments and
 residents. There seems to be accord and intelligent friendship; preserve this
 ou will be just and prosperous.

et you, the government, (Taimua,) to-day, when you will formally accept the
 promulgate them among yourselves, and then begin your re-creation.

ur flag is the emblem of your unity and the earnest of your good intentions; it
 s a language to you; be true to it. I have saluted it. Now, the maintenance of
 oody-politic is in your hands.

I have the letter of the government of Samoa (Taimua) to his Excellency the President of the United States, which I will in person present.

With these kindly expressions of high hopes for your government and people, you farewell, with God's blessing and hopes to meet you again.

You may be certain of the fraternal love of your friend and servant,

A. B. STEINBERGER,
United States Special Commissioner to Samoa

[Inclosure E.—Translation.]

HOUSE OF MALIETOA,
Moatua, October 4, 1873

CHIEF: This is my letter of love to you, the Chief who rules America. I am much pleased with regard to the union between our governments. My desire is good arise for this land. Now, this is my opinion and my wish, be pleased to appear for us the chief, Colonel Steinberger.

It is very proper for that chief to come here, to make things straight in this land. That is all my letter. May God grant you health and strength.

I am,

MALIETOA,
Zaupe

[Inclosure F.]

The foundation of the government of Samoa was laid in Mulinuu, August 21, 1873.

The origin of the government is by the action of the chiefs and rulers of Samoa, Taimua and Pule, and dates from Mulinuu, on the 21st of August, 1873.

We give thanks to God for the peace and good-will that we are enjoying, and unity that enables us to choose chiefs and rulers for the secure establishment of a Samoan government.

Being now exempt from the wars that formerly desolated our islands, we create laws in the hope that peace will continue, and Samoa be blessed among the nations of the earth, for God has made us of one blood, that we may live together on the face of the earth in one mind and in good fellowship.

Each one shall be free, and shall be at liberty to come and go as he wishes, and act according to his own views as long as they are in unison with the laws which are created for his benefit, and which, if he breaks, he must be judged.

The government is organized for the protection of the rights of every one, and allow no interference of one with the rights of another. The execution of the laws will operate alike upon all, chiefs, rulers, and common people; all will be judged as if they violate the law.

✓ 1. The entire Samoan government is based on Taimua and Pule.

✓ 2. We have chosen from among them seven chiefs and rulers, to be at the head of our government, and to rule one year each.

3. These seven chiefs are to be the highest rulers and judges, and shall have power to decide all questions, and make treaties and agreements with foreign powers, and to receive ambassadors and commissioners from them.

4. If any serious trouble occurs in any part of Samoa, the seven chosen chiefs and rulers shall adjust and settle it.

5. It shall be the duty of these chiefs to construct such laws as shall be for the interests of the whole Samoan people.

✓ 6. The duty of the Taimua shall be to enforce the laws upon chiefs and people, and also to respect all treaties made with foreign powers. The Taimua has the privilege of opening a council, and, in case of violent discussion or high words, shall have power to close the council.

✓ 8. The council of seven chiefs shall have one name, the Taimua.

9. All Samoans must show proper respect and deference to the Taimua, as they do to the chief rulers in Samoa.

10. The government can choose four rulers from among the people, who by their wisdom and intelligence will form the pillars of the edifice of government, and assist the Taimua by their superior judgment, and will also see that the laws are executed. They will be called governors, and their duties will be to oversee the work of the judges, the scribes, and all the government work of Samoa.

DUTIES OF JUDGES.

No person is to be fined without first being tried and found guilty.

All courts that are held shall have jurors.

No person shall be tried twice for the same offense.

No relative of any person accused shall be qualified to act as judge or juror in his

If any one has cause of complaint against another, he must first tell it to the
r in court, who will acquaint the judge.

TAKING OATHS.

I, the Taimua, swear before God to sustain and respect the government of Samoa,
to exercise our rule according to law.

We, the rulers, swear before God to sustain and respect the government of Samoa,
to maintain it according to the laws, and not to bring disgrace upon it by our
act.

There shall be no interference with the religion of any one, but each person shall
be to worship as he pleases.

The foundation of the government commences to-day, and will remain until
ruled by the Taimua and the rulers.

If any rulers wish any change in the laws, they must first notify the council, and,
at the end of six months, a meeting may be called to discuss the question of such
changes.

AMENDMENT TO THE CONSTITUTION.

That the government appoint judges in each district to have jurisdiction in such
cases for all cases except murder, rebellion, treason, or privy conspiracy.

UNITED STATES COMMERCIAL AGENCY,

Apia, Navigator's Islands, October 7, 1873.

I hereby certify that the within writing in English is a true and correct translation
of the herewith-attached writing in the Samoan language.

E. L. HAMILTON,
United States Vice-Commercial Agent.

[Inclosure G.]

SAMOAN LAWS.

GOVERNMENT HOUSE OF SAMOA AT MULINUU.

[These laws were written August 21, 1873.]

I.—*Law of murder.*

Murder is forbidden. Whoever kills another person maliciously shall be put to
death by hanging, and that in secret or within prison-walls.

Manslaughter.—Any person committing manslaughter shall be tried by jury; and,
if found guilty, shall be punished with imprisonment and hard labor, according to the
decision of the judge.

Whoever shall urge a man to kill another, and he does kill, both the instigator
and the murderer shall be put to death, (as per clause 1.)

II.—*Law for theft.*

Any one found guilty of theft shall be fined according to the nature of the offense,
with imprisonment and hard labor on the roads, besides returning the value of the arti-
cle stolen.

The *faa aiga* is forbidden; no one is to take anything the property of another be-
cause he is one of the family without asking for it; but should any persist in taking
the property of another because he is one of the family, the party guilty of this
shall be treated as a thief, judged, and punished as above.

3. Whosoever shall steal the property of another person and go and sell it to another purchaser knowing it to be stolen, but still persists in buying it, then both shall be punished according to the punishment of a thief, (as per clause 1.)

4. Any person finding property of another that has been lost, shall give such property in charge of the judge of the district in which such property is found, and said judge shall put out notice publicly, and upon identification of property by rightful owner it shall be given up to such owner.

III.—*Law concerning marriage.*

1. This is a contract between man and woman that they shall be one till death part them.

2. People wishing to marry shall first go to the judge who is named by the Samoan government to register their names, but if they first go to a missionary or teacher, the missionary or teacher marries them without being right (*tōnu*) with the judge, that marriage shall not be allowed, and missionary or teacher shall be fined \$25.

3. When any two, man and wife, are married, the family have no further concern over them, for they are one. Whatsoever they receive at the marriage belongs to them; it shall not be divided among the family; it is their own property.

4. There shall be no divorce or separation; once married they shall live together till parted by death.

5. Any party found guilty of elopement shall be punished by hard labor two years on the roads.

6. All who are married shall be registered in the registry office. And fee for marriages shall be \$1.50 for each party, to be given to the judge.

7. Polygamy is strictly forbidden; parties found guilty shall be punished with hard labor on the roads for two years, and the man to pay a fine of \$100.

8. There shall be no *toga* taken for elopements, according to heathen custom, but the parties are duly registered, then it shall be optional with the family to give presents, also at births; no *toga* unless the family choose to give any presents.

IV.—*Law for adultery.*

1. Any person convicted of adultery shall be punished by hard labor on the roads for four years.

2. Any man or woman who have lived and are at present living as man and wife shall from this day be looked upon the same as if a ceremony had been performed.

V.—*Law for perjury and false accusation.*

1. Any one found guilty of perjury and false accusation shall be tried and punished according to the nature of the offense by fine or imprisonment or hard labor.

VI.—*Law for slander.*

1. Whoever shall be found guilty of bad language or slander shall be punished by fine or imprisonment or hard labor.

VII.—*Law for rebellion.*

1. Any land or people rebelling against the Samoan government shall be driven from their lands, and they shall never return; they shall die away, and their property confiscated to the government.

VIII.—*Law for selling lands.*

1. Any one desirous of selling his land must report to the government, and, if he has a good right to sell, the government shall register such sale, and it shall be considered good.

IX.—*Law for tattooing.*

1. Tattooing is strictly forbidden in Samoa. There shall be no man tattooed in Samoa; it causes great evils in these islands. Any man guilty of breaking this law shall be fined \$100 and two years' hard work on the roads.

2. People from other lands breaking this law shall be fined \$200 and two years' hard work on the roads.

3. The tattooer shall be fined \$100 for each person he tattoos, and hard work on the roads for two years, and his tattooing instruments seized, and his property confiscated to the government, except house and subsistence for family.

X.—*Law for government officers.*

1. No judge, policeman, secretary, or ruler shall drink spirits to intoxication, or use bad language in the public roads or in the presence of the people; if any one charged with this offense he shall be tried, and, if found guilty, shall forfeit his office and be fined \$25.

XI.—*Law for the Sabbath-day.*

The Sabbath is sacred; no work shall be done on the Sabbath-day, except work of husbandry, or any who are in distress. Any one violating the sacredness of the Sabbath by quarreling, shall be tried and fined \$4.

No liquor to be sold or furnished at all on Sunday; any person found guilty shall be fined \$100.

Any person found drunk and noisy shall be fined at the discretion of the judge.

XII.—*Law regarding four-footed animals.*

Any four-footed animal trespassing into the plantation of any one, the fence be-
 reed, then the owner of the plantation may secure the animal and report to the
 owner of the animal and seek for damages, but if he refuses to pay them it is to be re-
 ported to the police, who will inform the judge, who will try the case.

It is strictly prohibited the loosing of a horse or cattle, or cutting of their ropes;
 any found guilty of this offense shall be punished by hard labor on the road.

It is strictly forbidden to tie any animal upon the land of another person without
 obtaining permission. Punishment for such offense, a fine at the discretion of the
 judge.

XIII.—*Law regarding trespass.*

No person shall trespass upon the property of another to take his fruits or vege-
 tables, or live stock or to work upon or appropriate such lands to his own benefit. Any
 violating this law shall be fined and put to hard labor on the roads.

XIV.—*Laws regarding assault.*

Any person provoking a quarrel or striking another without provocation with his
 stick or piece of wood, or anything else, and the party struck bearing it patiently, not
 resisting the evil, it is just that he be tried and punished at the discretion of the
 judge.

XV.—*Law regarding weapons or arms.*

No person shall carry arms of any description for the purpose of offense or defense
 or intimidation.

XVI.—*Law regarding persons helping others fined or punished.*

It is strictly forbidden any one helping a person who has been found guilty of vio-
 lating the laws; those helping shall be put to hard labor in proportion to fine at the
 discretion of the judge, and the party helped shall pay double the amount of the fine.

XVII.—*Law regarding people who do not send their children to school.*

If any do not send their children to school, they shall be tried; if guilty, they
 shall be fined.

XVIII.—*Law regarding public roads.*

All lands shall keep the public roads in repairs. Police shall attend to or watch
 the public roads. No racing of horses or any noises to be made in the public roads.
 Cattle to be left on the roads by Samoans or foreigners.

XIX.—*Laws respecting great journeying parties.*

It is strictly forbidden the entertaining of large parties journeying publicly. Any
 person journeying may go and take up their quarters where they choose; it is not
 compulsory for the families where they stay to entertain them.

All parties journeying on account of government shall be well entertained by the
 king and rulers of lands in Samoa.

XX.—*Law regarding dances.*

Night dances, according to the old Samoan or heathen custom, that is, dancing
 quite naked, and committing indecencies, are strictly forbidden. Any
 person proven guilty of breaking this law shall pay a fine of \$100 and shall be made to
 work six months on the road.

XXI.—*Law regarding vessels.*

No captain or master of a vessel shall take away a Samoan without a written per-
 mission of the governor or ruler of Samoa; then he may go. Any captain or master of
 a vessel or crew willfully breaking this law shall pay a fine of \$100 to the government.

2. Any Samoan desirous of going away in a vessel must first obtain the consent the governor or judge, then he may go; if not he cannot go on any consideration.

3. Any vessel having any contagious or infectious diseases on board shall not brought into harbor, but shall hoist a yellow flag at the foremast-head and stand and on while the pilot communicates with the consul of the country to which the vessel belongs.

4. Any one deserting from his vessel, the consul will report it to the judge, who will send and seek after the deserter, and if caught on this side of the island, \$10; if caught on the opposite side of the island, \$20; if caught at Atua, Aana, or Savaii, \$25; if caught after the vessel has sailed, he must pay \$10. If he has no money he must labor for the government.

5. If any person in Samoa shall secrete a deserter from a vessel in port he shall pay a fine of \$25. If he persists in secreting deserters his fine shall be increased at the discretion of the judge.

XXII.—Law regulating trading.

1. There shall be no restriction upon trade; it shall be left entirely to the option of the person, the value or price he may put upon his own goods, but all agreements shall be fully enforced. Any one violating his agreement shall be tried and fined according to the nature of the agreement he violates.

2. Any one not paying his debts, and the injured party seeking redress, it shall be inquired into, and if it is decided to pay, and payment refused, then such portion of the party (not paying) lands or other property shall be sold to cover his debts.

XXIII.—Law regarding weights and measures.

1. Any person, merchant, or trader altering his weights or measures so that they are not just or right with all true weights or measures is a thief, and shall be inquired into; and if it is proved that he has altered his weights and measures, he or they shall be fined for each offense \$100.

XXIV.—Law regarding money not full value.

1. No person, merchant, or trader shall in anywise give money of not full value for any one in payment for any produce. Any one found guilty of this offense shall be punished as a thief; not less than \$50, nor more than \$100.

2. And the same with any Samoan deceiving or perpetrating any fraud in trade; shall be fined as above—not less than \$50, nor more than \$100.

XXV.—Law of revenue.

1. As a revenue for the Samoan government, exclusive of fines, and for the support of judges, magistrates, and their officers and courts, there shall be a *per capita* tax of each for each male citizen grown, and half a dollar for each imported male laborer.

2. The government shall appoint special tax commissioner, who shall collect the tax and pay the money into the treasury.

UNITED STATES COMMERCIAL AGENCY,
Apia, Navigator Islands, October 7, 1873

I hereby certify that the foregoing 21 [25] laws written in English is a true and correct translation of the herewith attached 21 [25] laws written in the Samoan language.
[SEAL.] E. L. HAMILTON,
United States Vice-Commercial Agent

[Inclosure H 1.—Translation.]

APIA, October 1, A. D. 1873

We here are the teachers of the district of Dr. Turner, jr. We have prepared the present, the occasion of which is our joy in that we met with the American chief the night on which he addressed us words of warning and encouragement regarding the work of God. The chief was sent indeed on the message of the Government of America to the chiefs and rulers of Samoa, but notwithstanding that, he has condescended to address words of love to us teachers, and we have prepared a small present as an expression of our joy respecting him and his good words.

Present.—Taro, 155; bunches of bananas, 6; fowls, 15; pieces of native cloth, 1 mat, 2; fans, 6; combs, 4; tattooing instrument, 2; bonito fish hook, 1; club, (Samoan), 1; spear, (Samoan), 1; Samoan basket, 1; Ava bowl, (imitation,) 1; hands, 1; cinet, (specimen,) 1.

G. A. TURNER, M. D.

[Inclosure H 2.]

APIA, UPOLU, October 6, 1873.

teachers under jurisdiction of Dr. Turner, Paulo, Tuka, Milan, Solomona, Eeekieli, Fuaolevina, and others :

GENTLEMEN AND MY FRIENDS: I am not unmindful of my most serious interview yourselves; I see you and carry with me grateful recollections of you all. In a three-hour interview which I had with you at the house of your esteemed pastor, Dr. Turner, I regard as one of the important events in my intercourse with Samoans. You (teachers) who will in the days to come give power, prominence, and religion to our people.

I have spoken to your chiefs and rulers about you; I have used good but strong words to them relative to yourselves; they will heed them.

You must be proud and brave in your work. As you work for the good God and his kingdom to you, so do you labor for your own people. In turning away from all ill and in having contact of ungodly people, you manifest sincerity and belief.

Be true to your instructor, to your teachings, and you will be true to yourselves.

It is needless to put upon paper all that I have said to you; you listened with attention and I trust you for the future.

I give you my warmest expressions of gratitude.

I wish that I could address each one of you.

God's blessing rest with you is the prayer of your friend,

A. B. STEINBERGER,
United States Special Commissioner to Samoa.

[Inclosure I 1.]

APIA, UPOLU, SAMOA, October 7, 1873.

DEAR SIR: Please accept my sincere thanks for your kind note of yesterday.

I assure you I feel not a little pleased at the eminently successful issue of your mission to these islands. You came at a very appropriate time, when the native chiefs were all assembled for the purpose of endeavoring to establish law. Your honest and pure spirit has won the esteem and love, and you leave with the hearty good wishes of the entire native population. Although there are a few among the foreign population who prefer, for reasons best known to themselves, to live in a state of anarchy, you may feel assured that you have the hearty co-operation of all honest men, and that you have the welfare of the native race at heart.

I am true to the mission on which you came was a "somewhat delicate" one, and at the time I was afraid that you would not succeed so well as I hoped for, but now I most heartily congratulate you in that you have succeeded far better than my most sanguine wishes.

You leave with the knowledge that law and order is established. You may feel assured that the Samoans and all of the right-minded of the white population will do their utmost to keep things straight, and to see the laws carried out.

I leave us in order to fulfill the most important part of your mission. It only remains for me to bid you a hearty God-speed. You have our good wishes and our prayers, and we hope and trust that a brighter day is soon to dawn on Samoa.

The Samoans have expressed earnest desire that you should return and dwell among them and aid them in the capacity of first United States representative in Samoa. I only add that, should the Government be pleased to accede to that request, there is no doubt that will more gladly hail your return to these islands than

Yours, sir, and very sincerely,

GEO. A. TURNER.

A. B. STEINBERGER,
United States Special Commissioner to Samoa.

[Inclosure I 2.]

APIA, SAMOA, October 4, 1873.

DEAR SIR: We regret that since your arrival in Samoa there has been no general meeting of the members of our mission at which a formal letter could be prepared expressing our views with reference to the desired United States protectorate over the Samoan Islands.

In place of such a letter we take upon ourselves, as chairman and secretary of mission which has the religious care of four-fifths of the Samoan people, and know as we do the opinions of all the members of our mission, to assure you—

1. That we believe the expressed desire of the Samoans for a United States protectorate is a *bona-fide* wish on the part of the chiefs and people generally of Upolu, Savaii and Manono.

2. That we, and our mission generally, heartily concur in the desire of our people for the protectorate, believing not only that it will be of great benefit to the Samoan people, but that it will be the saving of the race.

3. That should your Government see fit to accede to the wish of the existing Samoan government for your own appointment as first United States representative in Samoa we shall be most happy to welcome you in that capacity; feeling sure, from what we have seen of you, that you will do justice to the Samoan people, and aid them in every possible way, in all their laudable efforts for social and political improvement.

We are, dear sir, yours very sincerely,

S. J. WHITMEE,
Chairman

G. A. TURNER,
Secretary

Secretary of the Samoan District Committee of the London Missionary Society

Col. A. B. STEINBERGER,
United States Special Commissioner to Samoa.

[Inclosure I 3.]

APIA, September 29, 1898

DEAR SIR: I have the honor to send you the amendment which I think necessary to be added to the law for marriages.

The Samoans have been practicing the divorce in a very loose manner. Marriages made indistinctly by any Independent or Wesleyan teacher were ordinarily dissolved after a few months or few years, and those have never been recognized as indissoluble in Samoa. Indeed, it can hardly be said they were serious sacred bonds.

But in the Catholic religion marriages are made only by ordained priests; and, even in Samoa, every Catholic knows very well that in no case we recognize possibility of divorcing. It is justice to bring back to their sacred engagements such parties who might have been induced by bad example to try to break them.

Allow me, dear sir, to take this opportunity for gratulating you on the wisdom you have shown in fulfilling the delicate and important mission conferred to your care by your government toward our poor and so disturbed Samoan people.

Since this last war our Samoan chiefs seem unable to govern their country without the help of a strong hand, which might keep them saved from miserable effects of jealousy between themselves. Even now, after having been exhausted by civil war, they have not put the power in proper hands, for fear of a new disturbance if the principal chief of such and such a district had been appointed as one of the seven rulers called Taimua, because his appointment might have been mistaken by his rival being the nomination of a king. So is the case with Mataafa in the district of Apia and Malietoa in the district of Tuamasaga.

Some intervention is necessary to bring that unsettled state to an end. Providence seems to show us that the Government of the United States is to take interest in this matter; may it be, as I hope, for the glory of God and the happiness of the Samoan people, to which's welfare we are to give, my collaborators and I, our strength and until death.

I have the honor to be, dear sir, your obedient servant,

Mr. A. B. STEINBERGER,
United States Special Commissioner.

† L. ELLOY, *Ev. de Tipaia*

[Inclosure I 4.]

SALEAULA SAVAII, September, 1898

MY DEAR SIR: In bidding you farewell after our pleasant intercourse in Samoa I wish at the same time to express my entire accordance with the object of your mission and the pleasure and satisfaction I feel that you have been appointed by the Government of the United States to discharge the important duties connected with it. I have long felt that the only hope of any settled government being formed in Samoa or of any real progress in the arts of civilization, must be either in alliance with

protectorate from some power apart from themselves. I have now lived in Samoa nearly thirteen years, and am, with one exception, the senior missionary of any now living in the group. I have lived almost entirely among the natives, and have had good opportunities for observing their customs and for judging their character. Armed with some anxiety on the first attempts made in particular districts to form codes of laws, and the subsequent war which has so afflicted the people and retarded progress has proved that my forebodings were well founded.

The Samoan chiefs and rulers, although accustomed to make petty laws for the government of their own towns, have no idea of any system or code of laws which would recognize the liberty of the subject and the power of the law. The consequence is that nearly all their regulations were either simply tyrannical, or so grossly abusive as to fail at once when they attempted to carry them into effect. Then the petty dissensions which exist, not only between particular districts, but between different villages in the same village, effectually prevent any real union among them in their present position. They are now engaged in an attempt to form a government for the whole group, but I have little or no hope of their ever being able to establish one which will be either permanent or effective. I fear, also, that difficulties will soon spring up between the natives and the whites, arising from the land sales which have been made during the late war. Should these lands be occupied, many difficulties will not only result from disputes about the titles, but also from the relations between the races. The Samoans will consider themselves as the rulers of the country, and in the event of any incapacity will, in all probability, pass laws to which the whites cannot agree, and the enforcement of which they will undoubtedly resist. Hence I fear, that unless there exists some authority to which both white and natives must be amenable, we shall soon have a state of enmity existing between the two races, which would prove disastrous to both, but more especially to the Samoans. For these reasons I rejoiced to hear of the petition sent by the chiefs, asking for a protectorate from the Government of the United States, and I earnestly hope that their petition will be favorably received. I have often spoken about it to the natives, and I believe that they are now unanimous in their desire for a protectorate.

With regard to yourself personally, I can only assure you that I shall ever remember with pleasure our intercourse in Samoa. You have certainly entered heartily into the spirit of your mission, and have spared no pains to make yourself acquainted with the customs and the Samoans, not merely as they exist around Apia, but in their own lands and in their own homes, where alone you can become fairly acquainted with them. In many journeys, both by land and sea, I believe that you have acquired more information concerning the manners and customs of the people and the resources of the country than you could possibly have acquired by a much longer term of residence at Apia, and I, as one who earnestly desires the prosperity of Samoa, feel very glad that you have acted as you have done. I may also add that the other members of the American mission here are quite of the same opinion as myself.

Wishing you a safe and pleasant voyage, I remain, yours sincerely,

GEO. BROWN.

A. B. STEINBERGER,
United States Commissioner to Samoa.

(Inclosure K.)

Now all men by these presents, that we, Maunga, principal chief of Le Fagaloa; Olo, principal chief of Le Alataua; Faumuina, principal chief of Le Saale; principal chief of Le Itua; Tuitele, principal chief of Le Alataua; Letuli, principal chief of Tualanta; Satele, principal chief of Le Taulatai; Fuamaono, principal chief of Le Alataua, being the principal chiefs of the ten houses of the island of Tutuila, Samoa, do hereby agree to form a league and confederation for our mutual welfare and protection and to unite our several districts under the flag raised at Pagopago on the 2d day of March, A. D. 1872; and we hereby do solemnly bind ourselves to carry out this covenant faithfully as far as our jurisdiction extends, and to maintain peace with each other and to carry out in our several districts the commercial regulations of Pagopago promulgated the 2d day of March, A. D. 1872, and recognized by Commander Ward W. Meade, United States Navy, commanding United States steamer Narragansett.

In witness whereof we have hereunto set our hands and seal this — day of March, 1872.

O AU O LEIATO, his x mark.
O AU O FAUMUINA, his x mark.
O AU O MAUAGA.
O AU O MAUGA.
MAL ITUAN.

Know all men by these presents that we, Tuitale, chief of Le Alatauna; Letuli, chief of Le Tualauta; Satele, chief of Le Tualatai; Fuimaono, chief of Le Asina, of the island of Tutuila, Samoa, having met in council this — day of March, A. D. 1872, do hereby agree to form a league and confederation for our mutual welfare and protection and unite our several districts under the flag raised at Pagopago on the 2d day of March, A. D. 1872; and we do hereby solemnly bind ourselves to carry out this covenant faithfully as far as our jurisdiction extends, and to maintain peace with each other, and carry out in our several districts the commercial regulations of Pagopago promulgated the 2d day of March, A. D. 1872, and recognized by Commander Richard W. Meade, United States Navy, commanding United States steamer Narragansett.

In witness whereof we have hereunto set our hands and seals this — day of March, A. D. 1872.

[Inclosure L 1.]

As an appendix to the above harbor-regulations, we have determined upon the rate of three cents per ton as harbor-dues for port of Pagopago, water being free and proper facilities given for same; this sum not subject to change until such time as we may buoy and mark out harbor, and construct and maintain light-house; this sum being paid by American ships as precedent.

Witness our hand and seal this 14th day of August, A. D. 1873.

I am the high chief.

[SEAL]

[Inclosure L 2.]

BRITISH CONSULATE, *Apia*, October 6, 1873.

I hereby certify that I approve of the following appendix to the harbor-regulations for the port of Pagopago, Tutuila, viz:

Three cents per ton as harbor-dues, water being free, and proper facilities given for same, this sum not subject to change until such time as we may buoy and mark out the harbor and construct and maintain light-house.

[SEAL.]

S. F. WILLIAMS,

Her Britannic Majesty's Acting Consul

[Inclosure M.]

SAMOAN TREES.

No. 1. *Alaā*.—Tree grows to a fair size, with straight stem, and but little foliage; bark thin, wood of light cherry color, straight grain, very heavy, and remarkably hard; there is but little sap, and the wood durable. This tree does not grow so much as enough for practical uses as an article of export.

No. 2. *Fetou*.—One of the most valuable timber-trees of Polynesia, but only attains a large size in Samoa and the Feejees; grows tall with heavy trunk; the wood is nearly white, but grows red as exposed; it is hard, curly, and heavy, is much used by the missionaries for rude cabinet-work; it has beautiful shades of red, but not as in texture as other heavier woods on the islands. Natives build large canoes of wood. Upon the eastern end of Savaii it grows dense enough to cut timber for export.

No. 3. *Milo*.—A large, straight tree with fine bark, the trees seldom growing together; there is but little sap; not heavy; about four-fifths of the tree consists of heart; a beautiful red color, fine texture; the tree quite accessible in Upolu and Savaii.

No. 4. *Tauanave*.—Tree sparsely interspersed throughout the group; will usually grow one log; the wood is easy to work, of a rich walnut color, and very durable.

No. 5. *Futu*.—A moderate-sized tree, cuts light, but grows brown by exposure; the wood is brittle, and soft; quite light, and used for canoes; not valuable wood for general purposes though much esteemed by the natives on account of the ease with which they work.

No. 6. *Talie*.—A moderate-sized tree, though it often attains great size; the wood is light maple-color, curly, and of fine texture; not a valuable timber-tree, as the heart of the tree is usually defective.

No. 7. *Ola*.—A small tree, found on all the islands; the wood heavy, hard, fine, straight.

- n, of a dusky purple color; is not sufficiently large for purposes other than tool-handle or finishing work.
- o. 8. *Laulili*.—A small tree, wood light cherry-color, curly, of close texture and exceedingly hard; heavy, and works too hard to be of any practical use except for sample work.
- o. 9. *Talafala*.—Tree small, very hardy, and quite plenty; a very valuable wood, with the color of American apple, but much finer in grain; susceptible of high polish.
- o. 10. *Feja*.—A fine shade tree, but soft, coarse-grained, dingy red color, and subject to quick decay.
- o. 11. *Gataa*.—A fine large tree, easily worked, straight-grained, of light cream-color; sappy, but dries well; quite durable; would make good house-lumber.
- o. 12. *Tamauu*.—A good-sized tree, but grows singly; a hard light red-colored wood; resembling cedar when dry; straight-grained, but the heart subject to decay.
- o. 13. *Mamala*.—A fine large tree; meager foliage; wood coarse, straight-grained, of coffee-color; works easy, but in working affects the throats of workmen.
- o. 14. *Leafa*.—Small tree; wood hard, maple-color, straight grain, and close in texture; too small for practical use.
- o. 15. *Lagauli*.—Tree about 20 feet in height, found throughout the group, bears aniferous flower, used by the natives for scenting oil. The bark of this tree is used by the natives for dysentery; probably contains tannic acid; wood light pink-color, handsome, and susceptible of high polish.
- o. 16. *Atone*, (nutmeg-tree).—Generally a small, straight tree, resembling hickory, in parts of Savaii attains a height of 50 feet; wood light color, but not so tough or close as hickory; there are many varieties of this tree which are indigenous.
- o. 17. *Falaga*.—A small tree, wood light-colored, very straight grain, exceedingly close in texture; desirable for tool-handles, capstan-bars, &c.
- o. 18. *Maatamea*.—A moderate-sized tree, wood light color, not very fine texture; strong, dry, and durable; light weight, and generally resembles chestnut; bark smooth.
- o. 19. *Vata*.—A fair-sized timber-tree; wood maple-color, light weight, straight-grained, cuts easily, but quite tough and durable.
- o. 20. *Sesaea*.—Tree about 50 feet in height; wood hard and tough, light yellow-color, of fine texture.
- o. 21. *Seitamu*.—A small tree, wood cherry-color, close grain, heavy, but works easily; not especially valuable.
- o. 22. *Lama*, (candle-nut).—A moderate-sized tree; wood soft; resembles cotton-wood on the water-courses of our Western States; worthless as timber; the nut of this is carefully prepared and used by the natives for lighting their houses; the smoke precipitated, and the soot used as a paint for tattooing.
- o. 23. *Noanafala*.—A short but heavy tree, wood dark color, close, hard, and heavy texture, cuts hard, and of no practical value.
- o. 24. *Fau*.—A most valuable tree, moderate size, wood hard, but little sap, the wood chocolate-color, very close and hard, used for canoes and house-posts; the fiber of the inner bark is used for making fishing-nets, cord, and a fine mat with long fringe, which, when bleached, looks like sheep-skin rug; used also for fringe on other articles; it is superior, in fineness and tenacity, to any known fiber. The tree is very abundant and accessible.
- o. 25. *Lanafanu*.—A moderate-sized tree, with spreading branches; wood lead-color, soft and coarse.
- o. 26. *Leasi*.—A small tree, wood color of the wood of the apple-tree; very fine delicate texture, hard and durable.
- o. 27. *Maali*.—A large tree, very abundant and sufficiently close for lumber, the wood light slate-color, coarse grain, but straight, dry, and light; quite hard; the gum isiferous and much used by the natives.
- o. 28. *Oliloti-Oli*, or *Fema*.—A worthless tree, growing on the margin of the water; the tree has a curious bark, resembling net-work with spots upon it.
- o. 29. *Mamalava*.—A large, fine, straight tree, wood color of white oak, not very close in texture but exceedingly tough; could be used for ships, masts, or generally in ship-building or repairing.
- o. 30. *Filofloa*.—A small tree; wood white, straight, and very tough; nearly resembles hickory; would be valuable for all the purposes for which hickory and ash are used.
- o. 31. *Toa*, (iron-wood).—A moderate-sized tree; wood dingy red-color, straight-grained, coarse and heavy, not unlike black-oak when first cut, but grows hard exposed, most durable wood.
- o. 32. *Maota*.—A short, heavy tree, dense foliage; wood light color, straight-grained but not enduring.
- o. 33. *Tarai*.—Would make good sawing-lumber; a moderate quantity upon all the islands; the wood hard, fine, straight, and resembles live-oak, perhaps more tenacious.

No. 34. *Ifi*, (Samoan chestnut).—Not a large tree, though many would cut one wood light color, straight, fine texture, and very tough.

No. 35. *Faui*.—A small tree, uniform in size, quite abundant, growing close enough for use; wood very light and dry, good for house-building and all general uses; work easy, and generally economical.

No. 36. *Vivao*, (wild Vi, to distinguish it from the Vi, a valuable fruit-tree).—A large tree, heavy, very sappy, and not valuable.

No. 37. *Auauili*.—A large timber-tree, but not abundant, except a smaller variety; this tree is called by the whites long resident "Samoan teak;" wood white, fine texture, and very tough; sometimes used for large canoes, but too hard for naval manufacturing.

No. 38. *Nonu*.—A large tree, not abundant, of straight grain, very hard, the texture quite coarse in texture.

No. 39. *Tui*.—A large tree, but sparsely interspersed throughout the group; a valuable wood, the heart of which resists decay in the fallen tree; the tree is tall and straight, wood of a delicate peach-color, exceedingly tough, and of fine texture; susceptible of a high polish.

No. 40. *Anume*.—A fine large tree, wood heavy and difficult to work, very durable, and generally used by the natives for posts, &c.

No. 41. *Oa*.—A moderate-sized tree, wood of peculiar pink-color, valuable for cabinet work; the juice under the bark is used by the natives for coloring or painting native cloth.

The above are corresponding numbers on blocks cut from trees and preserved as samples. These are by no means a complete memorandum of Samoan trees.

A. B. STEINBERGER.

United States Special Commissioner to Samoa.

[Inclosure N.]

SAMOA FRUITS AND VEGETABLES PRINCIPALLY USED.

FRUITS.

Indigenous:

Vi, Samoan apple.
Moli, orange, several varieties.
Ulu, bread-fruit, several varieties.
Tipoli, lime, several varieties.
Fala, pine-apple.
Niu, cocoa-nut, several varieties.

Exotic:

Banana, several varieties.
Guava, several varieties.
Lemon, several varieties.
Tamarind.
Citron.
Mango.

VEGETABLES.

Indigenous:

Talo-taro, several varieties.
Ufi-yam, eight distinct species and many varieties.
In gardens of whites are found melons, tomatoes, turnips, radishes, potatoes, onions, beans, peas, &c. Indian corn is grown, white cotton, indigo, coffee, nutmegs, (in quantity,) ginger, and many varieties of pepper, grow wild.

[Inclosure O.]

NAMES OF VILLAGES IN SAMOA.

Island of Manua—Faleasao, Fitiuta, Ta'u.—Jurisdiction of Tui Manna.

Island of Oloosinga—Vaiapi, Sili.—Jurisdiction of Tui Manua.

Island of Ofu—Ofu.—Jurisdiction of Tui Manua.

Island of Tutuila—Fagaalea, (Bay of Pagopago,) Utulea, Fagatono, Pagopago Ofa.—Jurisdiction of Mauga.

anie, Fagaitua, Alofau, Utumea, Tula, Ononoa, Aur, Massefau, Afonu, Vatia.—Jurisdiction of Leatu.

agasa, disputed, Salinoa, a petty chief.

so, (Massacre Bay,) Aluan, Fagumalu, Fagalaii, Poloa.—Jurisdiction of Fuimono.
apa-Tapa, (island extreme west end of Tutuila,) Amanave, Failolo, Satega, Nua,
n, Osili, Amluia, Leone, Aumu-Leone, divided by brook into two towns.—Jurisdiction
Tuitele.

sialoa-tai, (toward the beach,) Vaialoa-utu, (inland,) Taputima, Fagalua.—Jurisdiction of Satele.

alauan, Futiga, Iiili, Pavaia, Faleniu.—Jurisdiction of Le Tuli.

afuna, Nuunli, Faganeanea, Matuu.—Jurisdiction claimed by Mauga, but disputed.

land of Anuu.—Anuu.—Jurisdiction of Faumuina.

land of Upolu.—Mulifauna, Satapuala, Fasitotai, Seulumoega, Nofoaalii, Fasitouta,
easin, Malau, Saleimoa, Afega, Malie, Faleula, Faleata, Mulinu, Apia, Matantu,
inpolu. Vailele, Le Togo, Lailii, Luattannu, Solosolo, Saluafata, Lufilufi, Falefa,
stete, Fagaloa, Uafato, Tia-vea, Amaile, Aleipata, Le Pa, Latofago, Falealili, Siumu,
ata, Sanapu, Le Faga, Samatau, Maniani, (Bushtown,) Alaua, Lalomanga, Faleatiu.

land of Manono.—Satoi, Salua, Apai, Nunlopa, Saleatana.

land of Apolima.—Apolima.

land of Savaii.—Tafua, Salelologa, Iva, Sapapalii, Safotulafai, Faga, Tapuelule,
(and,) Lealatele, Sataputu, Samalaeulu, Malaola, Vaimauli, (inland,) Toapaipa,
ago, Saleaula, Satoalepai, Matantu, Manase, Safotu, Pai, (inland,) Samanga, Safune,
nvala, Saeina, Letui, (inland,) Aopo, (inland,) Asau, Auala, Vaisala, Fagasa, Vainuli,
Papa, Satana, Falealupo, Tufu, Neiafu, Falelima, Sinvao, Fagafao, Samata,
atuli, Faiaai, Vaipui, Fagasavii, Sagone, Foaluga, Gagaemalae, Jalallua,
alao, Taga, Tufu, Sili, Puleia, Satupaitea, Uliamoa, (inland,) Palauli, Aganoa.

No. 9.

Mr. Steinberger to Mr. Fish.

BALTIMORE, March 4, 1874. (Received March 4.)

SIR: To avoid newspaper reporters I remain in Baltimore, hoping for
expression of the sense of the Department and Government.
I am earnest in my desire to serve the Samoan people, and feel a sense
obligation to them, foreseeing also the great advantage to our Gov-
ernment.

Is it proper that I meet the heads of Departments?

Subject to orders of the Secretary of State,

I have the honor to be, your very obedient servant,

A. B. STEINBERGER.

77 Cathedral Street, Baltimore.

HON. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 10.

Mr. Fish to Mr. Steinberger.

DEPARTMENT OF STATE,
Washington, March 4, 1874.

SIR: Your letter of this date has been received. In reply, I have to
state that your report dated at sea, in regard to your visit to the Sa-
moan group of islands in the Pacific Ocean, reached here in due season,
and has been read with lively interest. It is replete with novel and
valuable information, and shows that you must have been a diligent and
careful observer.

I am, sir, your obedient servant,

HAMILTON FISH.

A. B. STEINBERGER, Esq.,

77 Cathedral Street, Baltimore.

No. 11.

Mr. Steinberger to Mr. Fish.

BALTIMORE, March 14, 1874. (Received March 16)

SIR: I have the honor to inclose copies of two letters from George Turner, Apia, (London Missionary Society,) and extract from letter Rev. George Brown, just received via Sidney.

I presume the colonial government hearing of my mission dispatched the Pearl to Apia.

I am proud that he (the commander) indorsed my acts.

Had I been in Samoa a few bad people would not have influenced chiefs to change their Sunday law, (selling liquor.)

The Mr. Hamilton mentioned has, in the absence of Mr. Coe, been acting as American consul. He is not a bad man, but a weak character.

I can with facility control these people; and to me it would be a labor of love, and I await the action of the Department.

I shall write to my friends in Samoa, and propose an address to the Samoan government, which I will submit to yourself. If approved should have an official air.

Each movement of myself, even in detail, will be faithfully submitted to the Secretary of State.

With high consideration, I have the honor to be, your very obedient servant,

A. B. STEINBERGER,
77 Cathedral Street

Hon. HAMILTON FISH,
Secretary of State, Washington, D. C.

(Copy.)

[Inclosure 1.]

Mr. Turner to Mr. Steinberger.

APIA, SAMOA, 29th October, 1874.

MY DEAR COLONEL: Your note of the 11th instant came duly to hand. I am glad that you succeeded so well in your interview with the chiefs of Leone and Paga. You will have no real difficulty there. Monga can do nothing against the Upola chiefs.

Your real difficulty will be with others than natives. Since you left all the Germans are up in arms against Pape, but he will not give in an inch. A deputation of publicans also waited on Samuel Williams, praying for the consuls to intercede with the native chiefs to get the law against grog-selling on Sunday modified. Samuel Williams brought the matter before Hamilton and Pape, and they got the natives to alter it. Grog-shops are to be open from one to three o'clock p. m., and after six p. m. You perceive we want some stronger authority to make folks strict to laws when they are made. Why should that law have been altered—because a few publicans desired it?

I have done all I could to point out justly to the chiefs the advisability of not yielding to the desires of any and every body.

Hamilton has also been expressing his amazement at hearing that I am going to send a translation of your letter to the "foreign residents," to the native chiefs.

He has been saying to some folks that it would be very injudicious to send such a letter to the natives. Of course I shall take no notice of this.

The laws come into force on Saturday first, and in a little while we shall see if they work.

When this reaches you, I guess you will have more to do than read any gossip that might give you.

Believe me, sir, yours, very sincerely,

Col. A. B. STEINBERGER.

GEO. A. TURNER, M. L.

[Inclosure 2.]

Mr. Turner to Mr. Steinberger.

APIA, SAMOA, November 14, 1873.

Y DEAR SIR: Just a line or two in a hurry. This is the palolo week, and I have a fresh lot for you, in spirits and bottled; they look very nice.

er Majesty's steamer Pearl has just been here; she is the new flag-ship on the Aus-
ian station. Commodore Goodenough has recognized the Samoan government; on
11th instant he had the Taimua on board, hoisted the Samoan flag at the main, and
a salute of seven guns. He addressed them also; told them how pleased he was
nd that they had formed the laws, and he hoped they would enforce them. He
them that if they enforced them impartially among themselves, made no distinc-
between chiefs and common people, that he would see that every Englishman
made to obey them also.

hen on the 12th he met all the British subjects and gave them a plain talking to.
Dean and one or two others made some objection to the laws, but he soon silenced
n.

e left on the following day, but expects to return in June or July.

his is our latest news.

With our united kind regards, I am, dear sir, yours very sincerely.

GEO. A. TURNER, M. D.

Colonel STEINBERGER.

[Inclosure 3.]

Extract from letter of Rev. George Brown.

APIA, November 6, 1873.

ere is nothing very new here since you left except a marvelous affair that has
n place at Samoa, about which you may have a laugh. The natives say that a pig
a litter of young pigs, brought forth four black ones; then, to their amazement, in
weeks from that time had another litter, of white and speckled ones. These latter
space, and soon became much larger and stronger than the first ones.

ter due deliberation as to what this marvel meant, they have decided that this is
eaning: The first litter of poor, weak, black pigs represents the Samoan laws and
rnment; the second litter, of white and speckled ones, is intended to represent the
rican protectorate, which is to overtake and absorb the Samoan taleforo. So this
e interpretation of the *sign*.

No. 12.

Mr. Steinberger to Mr. Fish.

BALTIMORE, April 8, 1874. (Received April 8.)

IR: The Samoan letters submitted by myself will nearly express the
ws of this people. They seek American protection. If the extending
n American protectorate over them is not at this moment deemed
isable by the Government, it then seems to be a matter of moment
t our Government will send a minister or commissioner, with pleni-
entiary power to recognize their government and treat with them as
ndependent people.

he government which I was mainly instrumental in creating has
n recognized by the commander of the English Australian squadron
-ship "Pearl."

he resources of the Samoan Islands are embodied in my report. The
ve chiefs are now devoted to America, and every foreign missionary
s American protection.

fter spending some months with these people, it is my judgment
t the United States extends a protectorate over the group, appoint

a governor and secretary, equipment for, say, one hundred men as a tive guard, clothing, muskets, a battery of four field-pieces (brass) ammunition, and a scientific corps consisting of a botanist, taxiderm photographic artist, and surgeon; the latter to be a microscopist.

The islands north and adjacent to Samoa, Eilbut, Ellier, and K mill group, speak a tongue analogous to the Samoan. These islands nearly depopulated by South American slavers, and in a few mo would be tributary to a Samoan government.

Any expenditure upon the part of the United States could be refunded by direct tax.

I present these views with the hope that my report, with accompanying documents, will be submitted to the Senate committee, with mes from his Excellency the President, and that I may be called upon to express the desires of the Samoans, as I feel to have their interest in mind.

I inclose newspaper-slip—San Francisco "News-Letter."

Nothing could be more damaging than a rush of adventurers to the islands; there is no gold or other precious metals in Samoa; this particular matter I have thoroughly investigated.

In my address to the Samoan government I shall caution them against any such excitement. This paper I will first forward to the Department.

I have the honor to be, your obedient servant,

A. B. STEINBERGER.

Hon. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 13.

Mr. Fish to Mr. Steinberger.

DEPARTMENT OF STATE,

Washington, 14th April, 1874.

SIR: Your letters dated March 14 and April 8, 1874, have been received. The subjects of which the letters treat are under consideration.

I am, sir, your obedient servant,

HAMILTON FISH.

A. B. STEINBERGER, Esq.,

77 Cathedral Street, Baltimore.

No. 14.

Mr. Steinberger to Mr. Fish.

BALTIMORE, April 17, 1874. (Received April 18, 1874.)

SIR: I inclose my letter to the Samoan government, ("Taimua Pule.") May I suggest that the Department officially indorses the paper and acknowledge receipt of their letters, also the "Fly-Flap" "Staff," and that the American consul at Apia be advised of the transmission of such papers, and defer to the same?

my reason for this I can better explain when I call at the Department.
I deem it important that the papers go to Rev. Dr. Turner, to whom I write asking him to make translation.

I have the honor to be, your very obedient servant,

A. B. STEINBERGER.

Hon. HAMILTON FISH,
Secretary of State, Washington, D. C.

[Inclosure 1.]

Mr. Steinberger to Mr. Turner.

WASHINGTON, D. C., April 12, 1874.

DEAR SIR: I send herewith an address to "The Taimua and Pule."
I ask that you carefully make translation, append it to original, (retaining copy,) deliver to the government?
At a later date I will write you fully in answer to your communication of the 14th of March, 1873.

I am, obediently, yours,

A. B. STEINBERGER.

V. GEO. A. TURNER,
M. W. of L. M. Society, Apia, Samoa.

[Inclosure 2.]

Colonel Steinberger to the Taimua and Pule.

WASHINGTON, D. C., U. S. OF AMERICA,
April 15, 1874.

THE TAIMUA AND PULE OF SAMOA:

This is my letter of love to you, these are my words of caution and expressions of profound solicitude. This piece of paper is as nothing, it is the thoughts transcribed in my heart, which come to you from that great and far-off Government, America, but which are now growing nearer to you.

I have presented your letters to the great chiefs who rule over America. Your "Fly-Flap" and great "Staff" of office have been received by the Department of the Interior, which controls the foreign action of America.

I have furnished our Government a full report of my intercourse with the Samoans. I have spoken of your country, your native productions, and the yet undeveloped resources of Samoa, the earnest, pious, and kindly labors of the missionaries. I tell how truly and truly you have accepted divine faith, and my belief in its perpetuity. I have officially communicated my experience among you, and been explicit as well as brief.

You are now introduced to our Government. I speak for you words prompted by the love of my country, born of my experience among you and genuine love for you, yet without the elements which might be incident to a proud recollection of your love and faith in America.

I have learned of the arrival of the English ship of war "Pearl" in Apia, the recognition of your government by Commodore Goodenough.

In the action of this estimable officer you will perceive the kindly disposition of our Government and governments to aid you, as well as to applaud your own virtuous efforts. The officer, in receiving you on board his vessel, the "Pearl," spoke cheering words to you, yet full of deep meaning.

For such interest in your welfare I feel sure of your gratitude and fixedness of purpose. Your grief is great, indeed, that you changed such parts of your laws as affect the degraded and mercenary ideas of a very few of the whites living among you.

I speak to you of the laws regulating the sale of liquor on the Sabbath-day. Do you thus sacrifice your most correct and virtuous plans? When I was among you you would not thus yield—the whites would not have demanded it. Do these people make demands for things which do not interest them? Do they ask that you abate the penalty for polygamy or tattooing?

I am proud and confident in your promise to maintain inviolable your government, to preserve peace in Samoa until I returned to you or you had a definite expression of opinion from, or positive action upon, the part of America.

My mission cannot be accomplished in a day, or even in a month. Our great council (Congress) is in session, and its action I believe in, but have not the right to anticipate.

As I love Samoa, so am I also proud of the Samoans. I have been earnest in your behalf without trespassing upon the valuable time and profound duties of the chiefs of our Government, but you have interested them, and God gives promises to protect the faithful.

In the right persist, maintain your laws, select good and proper magistrates for the different districts.

When a chief is refractory, deal in charity and wait with firm patience for other chiefs which may be better adapted to the whole people. This will come from experience and the aid of proper white people among you.

Make no arbitrary laws or regulations as to the selling of your products; it is no bringing yourselves into conflict with the foreign merchants; they will deal justly with you; trade and commerce will regulate itself.

You, the Taimua and Pule, have solemn duties to perform. You are responsible for the maintenance of peace, the unity of your people, the cultivation of honor and virtue, and the enforcement of penalties for crimes.

Such, in brief, are your responsibilities as administrators, but your sacred duties created as you are by the confidence of your people in the teachings and example of such attributes as may better elevate the Samoans, the practice of industry, the cultivation of your land, and accumulations of the products which nature has so bountifully given to you.

My chief injunction is that you destroy the jealousy existing among your chiefs. "God has made you of one blood" so must you be of one mind. It pleases me to see my people, "all Samoans are Christians," "all Samoans read and write." With pride I speak of my journeying among you, my talks to you from the pulpits in your churches, in councils, and my examination of your children in schools.

Now that your pride and manhood is stimulated to advance to power and civilization, you must practice peace and reach its full blessings. You will make your children great and prosperous by vying with each other for their education, and their future happiness will be proud of their fathers.

I see by newspaper publications that gold has been discovered in Samoa, and before I left Apia. I visited the places indicated, and now say, with all earnestness, *there is no gold in all Samoa*. I thank God for it; if it were so, you would be hopelessly ruined.

Thousands of adventurers, white people, would fill your islands, delve into the mountains, and the Samoan race would pass away.

This has given me great concern, as I know you will be more happy by preserving your integrity and simplicity of character, and avoidance of unnatural excitements through contact with an adventurous class of people.

I know that my words will not be unheeded; that time and distance will not change your virtuous intents.

As I am sincere in my own desire for your happiness and prosperity, I hope that the great chiefs will send me again to you, that I may fulfill the hopes and prayers of Samoa. This ends my letter to you, but there can be no ending to my love.

May our good God bless you and watch over Samoa and her people.

I am,

A. B. STEINBERGER.

To the CHOSEN CHIEFS AND RULERS OF SAMOA.

No. 15.

Mr. Fish to Mr. Steinberger.

DEPARTMENT OF STATE,
Washington, April 21, 1877.

SIR: Your letter of the 17th instant, requesting that a communication which accompanies it, addressed by you to the Samoan government, may be officially indorsed by this Department, has been received. In reply, I have to express to you my regret that it is not deemed expedient to comply with your request, as it would be contrary to the usual practice of the Department.

I am, sir, your obedient servant,

HAMILTON FISH.

A. B. STEINBERGER, Esq.,
Baltimore.

No. 16.

Mr. Steinberger to Mr. Fish.

BALTIMORE, November 19, 1874.

Before receiving instructions from the Department, I beg to present some facts and make a few suggestions. The Samoan Islands directly in the track of commerce between San Francisco and the British colonies; their population is about one-fourth less than that of the Sandwich Islands, and is increasing; the natives are mild and tractable and Christianized. A government has been organized, the "Taimua and Pule" representing every district in Samoa, and has been subscribed to by the white population. The Samoans want guidance and ask that I be returned to them. My devotion to the interests of the people is manifest. The great resources of the islands will be quickly developed. A war-vessel conveying me there should salute our flag and receive their chief officers of government at Apia, and enter the harbor of Pagopago, if only to show appreciation of the tender of this bay, without cost, to the United States. I respectfully suggest that the letter of the "Taimua and Pule" to his Excellency the President be answered, and the receipt of the "Staff," "Fly-Flap," and "Sacred Mat" of Atua be acknowledged. They virtually tender their country in parting with these symbols. Future legislation will determine the action of the United States in this, but I am confident of my popularity and the devotion of the natives to make Samoa valuable, creditable, and popular.

In the interest of the Samoans I have conferred with the Messrs. deffroy, at Hamburg. They are elevated and conscientious people, and the action of the German war-vessel in Samoa will not be repeated. We must be subject to legal adjudication. The agents of the Messrs. are instructed to this effect, and their influence is to be used at once on my arrival to secure the recognition of the Samoan government by Germany. I have definitely indicated (as per Department instructions) that all land-sales to foreigners must cease. I mention these facts because the agent of the Messrs. G. at Apia is also the German consul at that port.

The success of my mission would be promoted by having such diplomatic powers as would give me precedence over the American and other consuls. A few presents would gain much for us, such as two small guns, (brass,) a Gatling gun, a 12-pounder Parrott, to give dignity to their government-house; also a small lot of light clothing and small arms for guards, with such stationery as the Department (if in accordance with law) could furnish.

In the matter of the American consul, I can only present facts without opinion. Mr. Coe was not in Samoa when I was there, but he has lived twenty-six years among these people; seems to be well liked, except among some hostile English subjects. Mr. Foster is a foreigner, from Tahiti, has been about three years in the islands. Of his character I cannot speak from real knowledge. It is, however, certain that Mr. Coe would be more acceptable to the native population.

In submitting these meager suggestions, it is with the hope that your Excellency will continue to extend to me the confidence with which you have honored me.

I have, &c.,

A. B. STEINBERGER.

Hon. HAMILTON FISH,

Secretary of State, Department of State, Washington, D. C.

Mr. Fish to Mr. Steinberger.

DEPARTMENT OF STATE,
Washington, December 11, 1874.

SIR: The President having determined to authorize you again to proceed to the Samoan group in the character of a special agent of the United States, you will embark for those islands at San Francisco in a man-of-war, on board of which the Secretary of the Navy has been requested to direct you to be provided with a passage. The expenses attending this and of your mission generally must be borne by yourself and will in no event be recognized as a proper charge against the Government.

Pursuant to the suggestion contained in your letter from Baltimore of the 19th of November last, the President has addressed the accompanying sealed communication to the Taimua or Pule of Samoa, a copy of which is also furnished for your information. You will make proper arrangements for presenting the original.

The special passport with which you are also herewith provided describes your official character.

I annex hereto a list of articles which have been furnished by several of the Departments, which will be intrusted to you as presents, as suggested by you.

There is no doubt, from your report and from information received from other sources, that the Samoan group is naturally fertile and has many resources.

Its position, too, in the Pacific is commanding, and particularly important to us. It is more than doubtful, however, whether these considerations would be sufficient to satisfy our people that the annexation of those islands to the United States is essential to our safety and prosperity. In any event, supposing that the general sentiment should be favorable to such a measure, I am not aware that it has received such an expression as would require an acknowledgment by the Government and warrant measures on our part accordingly. It is deemed inexpedient without such a call from the public to originate a measure adverse to the usual traditions of the Government, and which, therefore, probably would not receive such a sanction as would be likely to secure success. Under these circumstances, your functions will be limited to observing and reporting upon Samoan affairs, and to impressing them in authority there with the lively interest which we take in their happiness and welfare.

I am, &c.,

HAMILTON FISH.

[Inclosures.]

LETTER OF THE PRESIDENT TO THE TAIMUA OR PULE, DECEMBER 11, 1874.—COPY SAME.—SPECIAL PASSPORT.

List of articles furnished by the War and Navy Departments for presentation to the Samoan government.

100 Springfield muzzle-loading rifle muskets, cal. .58. 10,000 cartridges.
1 Gatling gun and carriage, cal. 1 inch. 1,000 cartridges.

twelve-pound bronze guns and carriages. 200 rounds of ammunition.
 three-inch Parrott gun and carriage. 100 rounds of ammunition.
 Brozle boat howitzer, with ammunition.
 forge complete.
 suits sailors' flannel clothing, with caps.
 United States flags, and extra bunting.
 Some band instruments.
 revolvers, with ammunition.

S. Grant, President of the United States of America, to their Highnesses the
 Taimua and Pule, or Principal Chiefs of Samoa.

AT AND GOOD FRIENDS: I have received, through Col. A. B. Steinberger, whom
 to your islands as a special agent of the United States, the interesting letter of
 of October, 1873, which you were pleased to address to me. I am gratified to
 from that communication that peace prevailed in your country. This is among
 earliest blessings vouchsafed to nations, and I hope that your enjoyment of it may
 without interruption. You also inform me that the Samoan government had
 raised a flag. This is an interesting event in your history. My prayer is that, as it
 emblem of your unity and independence, these may ever remain inviolable,
 by the general consent of your people.
 your course generally, as reported to me by Colonel Steinberger, deserves my cordial
 approval and encouragement, which I offer you. I trust that you will persevere in
 doing. Although the chief city of the United States, whence I am writing to you,
 away from your islands, being near the coast of the Atlantic Ocean, our territory
 extends to the shores of the other ocean in which your islands lie, at not a much greater
 distance from San Francisco than is the city of Washington, which is our capital.
 You, then, as you are, much nearer to us than to any European nation, on this
 point alone it would be natural, were there no other reasons, that we should take
 a deep interest in your welfare and in all that concerns you.

The "staff," the "fly-flap," and the "sacred mat," which you intrusted to Colonel
 Steinberger, were safely delivered by him, and were received by me in the spirit with
 which they were offered. You may be assured that I am duly sensible of the signifi-
 cance of these gifts.

Colonel Steinberger's course during his first mission has so far met my approval, and
 seems to have made himself so acceptable to you that I have authorized him again
 to visit you, for the purpose of informing me of the progress of your affairs since he
 departed. I pray you, therefore, to receive him kindly, and to continue to him the
 goodwill which you showed on the former occasion.

May God to have you in His safe and holy keeping. Written at Washington, this
 11th day of December, 1874.

U. S. GRANT.

the President:

HAMILTON FISH,
Secretary of State.

No. 18.

Mr. Fish to Mr. Robeson.

DEPARTMENT OF STATE,
 Washington, December 16, 1874.

RE: As the instructions to the agent of the United States to the
 Samoan government are now ready, I will thank you to inform me
 whether you have decided upon the character of the presents which the
 War Department propose to send to that government. An early reply
 is desirable.

I have, &c.,

HAMILTON FISH.

No. 19.

*Mr. Robeson to Mr. Fish.*NAVY DEPARTMENT,
Washington, December 17, 1874. (Received December 18)

SIR: I have the honor to acknowledge the receipt of your letter of 16th instant in relation to the character of the presents that will be by the Navy Department to the Samoan government, and in r thereto I have to say that this Department can send the following cles to that government, and has given directions accordingly.

One Brozle boat howitzer, with ammunition; one forge, complete; hundred suits sailors' flannel clothing, with caps; three United St flags, and extra bunting; some band instruments; twelve revol with ammunition.

I have, &c.,

GEO. M. ROBESON,
Secretary of the Navy

BENICIA ARSENAL.

One hundred Springfield muzzle-loading rifle muskets, cal. .58; 10 cartridges; 1 Gatling gun and carriage, cal. 1 inch; 1,000 cartrid 2 12-pound bronze guns and carriages; 200 rounds ammunition; 13- Parrott gun and carriage; 100 rounds ammunition.

No. 20.

Mr. Steinberger to Mr. Fish.

U. S. STEAMER PENSACOLA,
San Francisco, February 2, 1875

SIR: I have the honor to report that I have personally superintend furnishing and delivery of material embodied in letter of instruct 1st. All material is on board excepting "flags, bunting, and band struments."

I have avoided publicity; will do my duty; report at or from e point.

I have to report that, in the absence of specific instruction, I a stranger on board the Pensacola, or the admiral seems to be in ignor of the purpose of the State Department.

Perhaps I might be aided by specific instruction from the Secre of Navy to the Admiral of Pacific Squadron.

I have the honor to be your very obedient servant,

A. B. STEINBERGER,
Special Agent, &c.

No. 21.

Mr. Fish to Colonel Steinberger.

DEPARTMENT OF STATE,
Washington, May 6, 1875

SIR: Dispatches recently received from Mr. Foster, the consul of United States at Apia, lead to the apprehension that, although, pursu to the instructions of this Department, your functions as special a

the Samoan Islands were limited to obtaining information in regard to that group, the rulers there consider that you have promised them protection of this Government. If this be as represented, it is much to be regretted, as no such promise was made, nor any hope of such protection was held out by warrant of this Government, and such promise, if made, was one which this Department, in the absence of a formal treaty, or of the sanction of Congress, had no right to authorize to make.

It is also stated by the consul that you assumed the right to levy tonnage-dues in that quarter, and professed to give a right to a native chief to examine registers without, on your part, having consulted a single foreign consul upon the subject.

This would present a case of the assumption and exercise of arbitrary and unauthorized power quite inconsistent with your instructions, which would be equally surprising and painful to the Department, but which, we hoped, is susceptible of explanation, which will consequently be acceptable.

Subjoined hereto are extracts from Mr. Foster's dispatches, referring to the points to which your attention is directed.

I am, sir, your obedient servant,

HAMILTON FISH.

Col. A. B. STEINBERGER,
Apia, Friendly Islands.

Extracts from dispatches of Mr. Foster, consul at Apia.

Mr. Foster to Mr. Hunter, No. 6, February 8, 1875.

Mr. Foster to Mr. Hunter, No. 7, February 8, 1875.

No. 6.

Mr. Foster to Mr. Hunter.

UNITED STATES CONSULATE,
Apia, February 8, 1875. (Received April 16, 1875.)

R:

There is still some danger of war, but not until they hear definitely from the United States in regard to a protectorate, which they consider has been promised them with a speedy return of Col. A. B. Steinberger, with the presents promised, and until this untitled little can be done in regard to claims or any other affairs with them:

I have, &c.,

S. S. FOSTER,
United States Consul.

No. 7.

Mr. Foster to Mr. Hunter.

UNITED STATES CONSULATE,
Apia, February 8, 1875. (Received April 16, 1875.)

R:

Commander Meade's treaty with Manga and the other chiefs of Tutuilla, March 9, 1874, did not fix any rates, leaving to the foreign consuls and a steamboat agent, in Manga, to regulate them. The majority of this counsel are men well acquainted with trade and native customs, and accordingly, by mutual consent, by the failure of the Steamboat Company to appoint a commissioner, inoperative until the arrival of

Col. A. B. Steinberger, August 17, 1873, who assumed the right without consulting the foreign consul in Apia, to levy tonnage-dues, and gave a native chief the right to examine a ship's register.

I have, &c.,

S. S. FOSTER,
United States Consul

No. 22.

Mr. Steinberger to Mr. Fish.

MULINUU, SAMOA,

October 18, 1875. (Received December 6, 1875)

SIR: I avail myself of the first opportunity to acknowledge receipt of State Department dispatch dated May 6, 1875.

As this dispatch can only refer to my former visit to these islands, I beg to call the attention of the Department to my report, Executive Document 45, p. 46; my letter to the Samoan chiefs, now at Apia, October 1, 1873; letters of the white residents to me August 19, 1873; and my answers, October 6, 1873.

At no time, by word or action, have I ever held out a hope to the people of Samoa of protection or annexation; to the contrary, my object has been to convince the native chiefs of the necessity of supporting and protecting themselves. (*Vide* my address to the chiefs, October 22, 1875, in the presence of the consuls and American naval officers.)

America is great, rich, and prosperous. From Samoa they wish for nothing but to have our ships enter your harbors and their people be protected. We have millions of square miles of territory, and our tradition, policy, and feeling are opposed to the acquisition of distant lands, &c.

Upon my former visit, Mr. S. S. Foster was not the American Consul, and J. M. Coe, commercial agent, was absent.

The statement by the consul that I—

Assumed the right to levy tonnage-dues in that quarter, and professed to give the right to a native chief to examine registers without, on your part, having consulted the single foreign consul upon the subject.

Not only have I not assumed such powers, but the Government has passed no law with regard to harbor or tonnage dues, and Pago Pago is not, under the new government, a port of entry.

When in Pagopago Harbor, in August, 1873, I found that Matafua, the high chief of the bay, had become imbued with simple notions of the importance through the treaty with Commander Meade, and the charging pilotage and harbor-dues, for which he was to buoy the harbor and furnish fresh water free to all ships.

My only action was the appendix to Commander Meade's harbor regulations. (*Vide* report, Ex. Doc. 45, p. 55; upon same page, see appendix of British consulate, October 6, 1873.)

Manga, the chief of Pagopago, claimed to be independent. The appendix to Commander Meade's rules served to check a petty chief from protecting shipping until such time as he became subservient to the general government, which accompanying dispatches will fully explain.

Grateful to the Department for the confidence expressed, "it is his hope" is susceptible of explanation, which will consequently be acceptable.

I have the honor to be, your obedient servant,

A. B. STEINBERGER

Hon. HAMILTON FISH,

Secretary of State, Washington, D. C.

No. 23.

Mr. Steinberger to Mr. Fish.

APIA, SAMOA,

July 4, 1875. (Received August 30.)

RE: * * * * *

I have the honor to report that I have accepted the position of premier of the kingdom, but publicly announced that, as an American citizen, I should receive no pay, emoluments, or title of nobility. My duties are arduous and laborious. I have the entire confidence of the native population and all the well-disposed whites. For the success of my labors I pray for the blessings of God.

My detailed report will furnish all information.

* * * * *

I may I ask the assistance of the Department in the passage of a bill by Congress permitting me, as an "American citizen," to hold office under a foreign government. So much does America fill the hearts and minds of these people that any treaty for harbors, naval stations, coaling-depots, or other privileges draughted in Washington would receive prompt recognition here.

I have, &c.,

A. B. STEINBERGER.

No. 24.

Mr. Steinberger to Mr. Fish.

MULINUU, UPOLU, SAMOA,

October 28, 1875. (Received December 6, 1875.)

RE: That I may report more intelligently, I have the honor to transmit accompanying documents, copies certified and translated by the British secretary and interpreter of the Samoan government. In this they have been precise, as such papers will speak a more decided language to the Department than any elaborate report.

No. 1.—Census for the Samoan Islands for the year ending 1874.

No. 2.—Shipping-list from April 1, 1875, to August 15, 1875.

No. 3.—Copy of license law 26th July, 1875, to go into effect August 15, 1875.

No. 4.—Copy of duty law 24th August, 1875.

No. 5.—Letter from London Missionary Society to Colonel Steinberger.

No. 6.—Letter of instruction from the premier to the respective governors of the districts.

No. 7.—Recognition of the government of Samoa by King Kalakoua, of Hawaii.

No. 1.—Steinberger to the three consuls, (English, American, and German,) also Ruge, Heedemann & Co., relative to pilot.

No. 2.—Alfred L. Pappe, German consul, to Steinberger, relative to pilot.

No. 3.—S. S. Foster, American consul, to Steinberger, relative to pilot.

No. 4.—S. F. Williams, English consul, to Steinberger, relative to pilot.

B, No. 5.—Messrs. Ruge, Heedemann & Co. to Steinberger, relative pilot.

C, No. 1.—S. S. Foster, United States consul, to the Taimua, requesting a recognition of himself by them, January 28, 1875.

C, No. 2.—S. S. Foster, United States consul, respecting rent demanded by J. M. Coe, for land, March 18, 1875.

C, No. 3.—S. S. Foster, United States consul, to the Taimua, informing them of receipt of letter from Hon. Hamilton Fish, March 24, 1875.

C, No. 4.—S. S. Foster, United States consul, to the Taimua, respecting various cases, John Lee, &c., March 26, 1875.

C, No. 5.—S. S. Foster, United States consul, to the Taimua, informing them of the sitting of the naval court of inquiry, April 2, 1875.

C, No. 6.—S. S. Foster, United States consul, to the Taimua, informing them that J. M. Coe demands \$50 per month rent for land, May 1, 1875.

C, No. 7.—S. S. Foster, United States consul, to the Taimua, informing copy of letter from J. M. Coe, regarding land at Mulinuu, May 1875.

C, No. 8.—L. Foster to the Taimua, telling them of S. S. Foster's non-attendance on account of sickness, May 18, 1875.

C, No. 9.—S. S. Foster, United States consul, to the Taimua, requesting them to take steps to punish the people who broke into William Henry's house, May 21, 1875.

C, No. 10.—S. S. Foster, United States consul, to the Taimua, informing them of the decision of the consular court against H. C. Edwards, June 1, 1875.

C, No. 11.—S. S. Foster, United States consul, to the Taimua, respecting the arresting of Alfred Smalley and John Johnson, September 1875.

C, No. 12.—S. S. Foster, United States consul, to the Taimua, making a protest against the government assuming power, September 25, 1875.

C, No. 13.—S. S. Foster, United States consul, to the Taimua, stating various cases of the arrest of Americans, September 25, 1875.

C, No. 14.—Colonel Steinberger to S. S. Foster, United States consul, in answer to his letter stating various grievances, &c., October 9, 1875.

C, No. 15.—S. S. Foster, United States consul, to the Taimua, acknowledging receipt of their dispatch, October 13, 1875.

C, No. 16.—S. S. Foster, United States consul, to the Samoan government in reference to J. M. Coe's claim on land at Mulinuu, October 16, 1875.

C, No. 17.—Steinberger to S. S. Foster, United States consul, stating that a land commission will be appointed, &c., October 16, 1875.

C, No. 18.—Tamasese to the premier stating that he and not Toomaltotoi is the owner of the land at Mulinuu, October 18, 1875.

C, No. 19.—Toomalotai to the Taimua, stating that Mr. Coe has no control over a certain piece of land, October 19, 1875.

D, No. 1.—S. S. Foster, United States consul, to Steinberger regarding an assault made on him and requesting the arrest of H. C. Edwards and J. P. Woodworth, June 3, 1875.

D, No. 2.—Warrant from S. S. Foster, United States consul, for the arrest of H. C. Edwards, June 3, 1875.

D, No. 3.—S. S. Foster, United States consul, to the Taimua, asking their protection from H. C. Edwards and J. P. Woodworth, June 3, 1875.

D, No. 4.—S. S. Foster, United States consul, to Steinberger, respecting H. C. Edwards and J. P. Woodworth, June 4, 1875.

D, No. 5.—S. S. Foster, United States consul, to the Taimua for the arrest of J. P. Woodworth, July 6, 1875.

- , No. 6.—J. P. Woodworth's letter to the premier demanding trial,
 , No. 7.—Proceedings of the trial of H. C. Edwards for assault upon
 Foster, United States consul.
 , No. 1.—S. S. Foster, United States consul, to the Taimua, inform-
 them of his appointing E. L. Hamilton vice-consul, January 9, 1875.
 , No. 2.—Copy of report by D. S. Parker (appointed vice-consul) to
 consul, &c., March 2, 1875.
 , No. 3.—Copy of commission to D. S. Parker, from S. S. Foster, as
 consul, March 2, 1875.
 , No. 4.—S. S. Foster, United States consul, to the Taimua inform-
 them of his appointing J. M. Coe vice-consul, October 11, 1875.

"PEERLESS" PAPERS.

- , No. 1.—S. S. Foster, United States consul, to Capt. George Ham-
 ilt, September 20, 1875.
 , No. 2.—Steinberger to S. S. Foster, United States consul, Septem-
 21, 1875.
 , No. 3.—S. S. Foster, United States consul, to Steinberger, Septem-
 24, 1875.
 , No. 4.—S. S. Foster to Capt. George Hamilton, September 24, 1875.
 , No. 5.—Capt. George Hamilton to S. S. Foster, September 28, 1875.
 , No. 6.—Receipt from S. S. Foster, United States consul, account
 yacht Peerless.
 , No. 7.—Letter from S. S. Foster, United States consul, to Capt.
 rge Hamilton, September 29, 1875.
 , No. 8.—Capt. George Hamilton to S. S. Foster, United States con-
 September 30, 1875.
 , No. 9.—Capt. George Hamilton to A. B. Steinberger, October 16, 1875.

Maps.

- , No. 1.—Samoan group with organized districts and villages.
 , No. 2.—Samoan seals with translation of mottoes.
 until such time as a government press is established I shall esteem
 y duty to furnish the Department copies of all important papers
 h might serve as data for the United States Government, perhaps
 dering their judgment now and in the future more correct.
 a landing upon these islands I was not unmindful of the fact that I
 a most delicate duty to perform.
 hat I was an accredited agent of the United States Government
 out pay, as per instruction from State Department, December 11,
 t:
 e expense attending this and your mission generally must be borne by yourself,
 will in no event be recognized as a proper charge against the Government.
 herefore, I was at liberty to associate with the natives and advise
 m of the kindly feeling of our Government toward them, as per in-
 ctions of same date, "impressing those in authority there with the
 y interest which we take in their happiness and welfare."
 he presentation of arms was not esteemed of as great importance to
 n as the fact that I was returned to them; the capacity in which I came
 only to them an earnest of the lively interest which the United States
 k in their welfare; but in no wise have the Samoan rulers or the
 ple estimated my return as an attempt at annexation, protection, or
 ing any political or national signification other than comity, good

will, and protection for American commerce, as well as a stimulus to future trade.

I could not ignore a special injunction in the Department instructions of December 11, 1874:

Its (Samoa) position, too, in the Pacific is commanding, and particularly important to us.

I found upon arrival here that much of the foreign element domiciled upon the islands was opposed to a government; but despite such hostility to the natives and the missionaries, the people had remained devoted to their promise to me, and after the lapse of nearly two years I found the chiefs congregated at Mulinu supporting the old laws which I had (in conjunction with the English consul) made for them. (*Vide* my report, Executive Document 45, page 48.) These laws were crude indeed, but adequate for the maintenance of peace, and the first step a necessary unification of the people, preliminary to the establishment of an organized and well-regulated government.

The acquisition of the Fejii group of islands by the English government was consequent upon the internal dissensions of the people and the moneyed ambition of the white settlers. The Samoans came to understand this, and were earnest in their efforts to consolidate and preserve peace.

My efforts after arrival was to gain such real information as would best comport with instructions and benefit the people whom I came among, without assuming authority based upon presumptive desires of the Department. At the same time, a careful consideration of the interests of the natives, and the cultivation of a strong friendly feeling upon their part toward the United States, I esteemed to come within the spirit of my instructions. To better accomplish this I have rigidly adhered to the policy pursued by me during my first visit, and act up to the letter of my original instructions, State Department paper of March 29, 1873—

In the course of your communication with the chiefs in the islands, you will caution them against making grants of their lands to individual foreigners.

(*Vide* my report, Executive Document 45, page 36.)

At this date I see no good reason to change the estimate I then placed upon foreign schemers for the acquisition of lands. If upon my return had I imbibed other views, and fraternized with the foreign element, my road would have been smoother, and my popularity with the foreigners great. The "Polynesian Land Company" referred to has long since gone into liquidation; their efforts to acquire land and the means of doing it by the agents of the company here were most iniquitous. To the senseless newspaper charges that I was connected with such a corporation my every act is a direct refutation. I notified United States consul, Mr. S. S. Foster, the agent of this company, during the session of the "Tuscarora" court, that, in the interest of the Samoans, I would oppose the land claims of this delinquent company, which has resulted in a coalition between the United States consul and one J. M. Coe, former United States commercial agent, and other Americans against the Samoan government. Fortunately much of this property was bonded for a term of two years, the earnest-money being insignificant, usually a gun, powder, and lead, and every effort thereby made to prolong a horrible war.

Since the departure of the United States steamer Tuscarora I have paid much attention to the land-claims of individual foreigners. I find that during the war a native chief, who was at the head of a family and controlled all family lands, would make deed of his property to a white

sident, that it might be protected against the opposite war-party, or during peace to prevent some other member of his family selling it. These were deeds of trust—a small sum of money paid with the understanding that the property was to be redeeded; hence the credulity of the natives was imposed upon, and such property withheld. I am glad to report that of the many cases of such deeds of trust but few have been withheld. Generally the property has been redeeded upon payment of the original money advanced. Those cases, however, wherein the land has been withheld and the property claimed as being a “bona-fide” sale, and the parties Americans were not brought before the “Tuscarora” court, noticeably the claim of J. M. Coe, for land at the seat of Government is one, (see Docs. C, No. 2, C, No. 6, C, No. 7, C, No. 16, and C, No. 17,) the latter a letter from “Toomalotai,” a high chief to the Taimua. When the “Tuscarora” court was in session, presuming that the claims of Americans would all be handed in for investigation, the native government progressed in their own and the consular courts (German) with German claims. At the outset this was attended with great difficulty, as the German element in people, trade, and possessions are vastly superior to all other foreign elements combined.

The house of J. Cæsar Godeffroy & Son, of Hamburg, now control the trade of the islands, as well as a great proportion of the trade of the South-Pacific Ocean; from three to fourteen large vessels are at all times anchored in the harbor of Apia taking in freight. The agent of this company is also the German consul. They have several large cotton-plantations worked by natives of the Gilbert, Ellice, Kingsmill, Caroline, and other islands. The agents and overseers are cruel, and the laborers virtually slaves. The establishment of a government upon these islands, the traditional independence of the people, and their own suffering from German aggression, was apt to produce discontent among the laborers from other islands; hence the treatment of German claims was a delicate task, wherein many elements were to be harmonized and great concessions to be made, and no people could have behaved more wisely or with greater patience than the Samoans. The success of the government in this direx is best made manifest by recent letter of the German consul, Doc. A, No. 9.

The census of the islands for 1874 is shown by Doc. A, No. 1. Since the war the general health is improving and the native population increasing. This is in part owing to the adoption of more civilized foreign customs and dress; everywhere is seen the evidence of an earnest disposition to progress.

Doc. A, No. 2, shows the arrivals and departures of vessels at the port of Apia, from April 1 to October 18, 1875. This is as full a statement as can be given, as they are mainly German, and they are jealous of imparting information. The shipments are cotton and copra, the latter the dried fruit of the cocoa-nut, shipped to Europe, where the oil is expressed and the residue made into an oil-cake for cattle. Of the productiveness of the islands and future trade, I can scarcely add to my report of 1874, Ex. Doc. 45.

In the draughting of laws great care has been taken to consult the interests of the foreign whites as well as the natives before enactment, and all laws which in their bearing most concern the whites are submitted to the consuls. Of such laws the license law, Doc. A, No. 3, is the one which has given rise to the hostility of evil-disposed people in the port of Apia. One-half of the occupied houses were grog-shops, brothels, and open places of debauchery; there are now but three licensed houses, the law is rigidly enforced, and the so called “publicans,” with

their associates and patrons, spare no effort to assail the government. Not only do they write most atrocious stories to the American press, but post anonymous placards with caricatures throughout the town, Commander Erbeen, the officers of the United States steamer Tuscarora, His Excellency the President of the United States, and others receiving a full share of such attention. The avocation of these people is destroyed. Generally they are incapable of other pursuits in life, and will ever remain a source of annoyance to the authorities. The hearty support of the English and German consuls in such humanitarian laws proves most gratifying to the government. Of the American consul, it is impossible for me with truth or justice thus to speak.

The duty upon spirits was concurred in by the consuls, Doc. A, No. 4. It is less than one-half of the spirit duty of Hawaii, and is inadequate to the desires of the Government to prevent the use of spirits by the natives.

No law for tonnage or harbor dues has been passed, though harbor regulations, quarantine laws, and collectors' duties are draughted and have been submitted to the German and English consuls, (American consul absent.)

In the appointment of a pilot, the government consulted each of the three consuls, and the firm of Ruge, Heedemann & Co., (*vide* Doc. B, No. 1,) and received answers Docs. B, No. 2, B, No. 3, B, No. 4, and B, No. 5.

The pilot, E. L. Hamilton, received his license accordingly. The Germans would naturally be consulted, as their ships number ten to one of all other nations combined.

The long association with and intimate knowledge possessed by the missionaries of the Samoans mark them as proper parties to consult relative to special laws looking to the prosperity and happiness of the people. Their communication, Doc. A, No. 5, will better explain this.

G, No. 1, are accompanying maps of the islands, excepting the extreme easternmost islands taken from Wilkes's survey. These maps give each district with the boundary-lines correct, showing the location of each village, with their names. These districts have been as distinct as are the commonwealths in the United States; for generations they have preserved their distinctive characteristics and independence. All are now incorporated into the general government as per constitution. (Copy forwarded by Tuscarora.)

A governor has been appointed for each district; also judges, treasurers, secretaries, magistrates, sheriffs, policemen, and other officers and servants of the government. Doc. A, No. 6, is the general letter of instructions to each governor, varied slightly in some of the districts.

I am pleased to forward a copy of the recognition of the kingdom of Samoa by His Majesty the King of Hawaii, (Doc. A, No. 7,) by this mail; the draught of a treaty will be sent to Hawaii for ratification by that government.

It affords me great pleasure to transmit through the Department an autograph letter, with translation, from His Majesty King Malietoa I to His Excellency the President of the United States.

His Majesty springs from a long line of Samoan kings, and is of high caste upon his mother's side; he is a young man, trained by the missionaries, educated, and imbued with deep religious convictions. During the recent war his person was considered sacred, and now ambitious only for the prosperity of his people, in which he has the zealous support of every government official and the entire population except such as I have before alluded to.

In transmitting copies of correspondence between the United States

consul, Mr. S. S. Foster, and the Samoan officials, I will deal in as little comment as possible, but calling the attention of the Department especially to Doc. C, No. 14. The absurdity of the different titles used by the United States consul in letters to the Samoan government is indeed noticeable.

In the cases of "Henry," (*vide* Doc. C, No. 9,) and "Jackson," (Doc. C, No. 13,) I cannot forbear explanation.

"Henry" is an American negro, long resident upon the islands, the keeper of a vile groggery and brothel; until the enactment of the license-law, his place was the scene of riot and open depravity; and it is not astonishing that he should at some time be the victim of his own lawlessness.

"Johnson," another American negro, was fined nearly a year since by a judge in a district remote from here or the consulate for attempted murder; he is a lawless character, but bearing the passport of the American consul, (*vide* S. S. Foster's letter to the Taimua, Doc. C, No. 13,) the government has taken no further steps, awaiting answers from the consul to government communication, Doc. C, No. 14.

S. S. Foster's complaint to the government, (Doc. C, No. 13,) and protest against the government, (Doc. C, No. 12,) have been met in a conservative spirit. (*Vide* Doc. C, No. 14.)

At times it is difficult to determine who is the consular representative of the United States here. Docs. E, No. 1; E, No. 2; E, No. 3, and E, No. 4 are appointments of vice-consul; but in no case have the authorities a notice of return to post of duty or revocation of such appointments.

Mr. D. S. Parker was appointed vice-consul the beginning of June, 1875. Mr. Foster sailed for Tonga June 4, 1875, and returned June 29, 1875. I regret not being able to furnish his notification of the appointment of D. S. Parker at this time, though his complaint against H. C. Edwards and J. P. Woodworth June 4, 1875, was sworn to before D. S. Parker, United States consul, with consular seal affixed. (*Vide* Doc. D, No. 4.)

On the 11th of October, 1875, Mr. S. S. Foster notifies the government of his appointment of J. M. Coe as vice-consul. (*Vide* Doc. E, No. 1.)

On the 13th October, 1875, Mr. Foster officially addresses the Taimua, acknowledging receipt of state papers; (Doc. C, No. 14;) also mentioning his proposed departure for Tutuila. (*Vide* Doc. C, No. 15.) On the 16th October, 1875, Mr. Foster officially addresses the government relative to claims of J. M. Coe for land at Muliunu, (seat of government,) enclosing copy of letter from J. M. Coe to himself. On the 25th October, 1875, Mr. Foster sailed for Tutuila.

I prefer transmitting the papers in regard to the claims of J. M. Coe, therefore alluded to, with no other comment than that a fraternization of interest between Mr. Coe and the consul, in view of the action of the scarora court and the long-standing personal enmity of these two personages, seems most extraordinary. I have, per July dispatches, notified the Department of an assault committed by A. C. Edwards, an American, upon the United States consul on the 3d day of June, 1875. On July 6, 1875, Mr. Foster, after his return from Tonga, demanded the arrest of one J. P. Woodworth, as accessory to the assault. This was the day fixed for the trial of Edwards. A warrant was issued for his arrest; but Mr. Foster told me he did not wish the case of Woodworth to proceed.

The jury was composed of six whites, two selected by each of the consuls, German, English, and American, and six Samoans. Edwards had

been in close custody for over one month, and whatever my own opinion might have been, I could not interfere with such a jury. At that time I held no official position under the Samoan government; I had simply been appealed to by the consul for protection, and at once took steps to arrest the assailant.

On the 15th October, 1875, J. P. Woodworth petitioned the government to bring him to trial, (*vide* Doc. D, No. 6,) that he might refute the charges of S. S. Foster, made July 6, 1875. (See Doc. D, No. 5.) Proceedings of the trial of H. C. Edwards will be found in Doc. D, 7.

Edwards was the keeper of a low groggery; Woodworth a comparatively new comer, and for a time the clerk of the United States consul.

Had Mr. Foster remained in Samoa, and not left the day after the assault, there is no doubt but that the punishment of Edwards would have been severe, but his protracted absence, and the confinement of the prisoner, finally produced a change of sentiment.

The parties who were then most inimical to the consul, are now his companions; his poverty, entanglements, and lack of intelligence, I think, render him unfit to be the representative of a great nation. I would not presume to recommend, but I believe the interests of the United States would be better served by the appointment of a conscientious and intelligent party unknown to Samoa; consequently free from the complications and petty jealousies existing here.

YACHT PEERLESS.

I inclose copies of all papers relative to the yacht Peerless, except her papers, which are in the consulate. The Peerless is a schooner-yacht, built by R. L. Ogden, of San Francisco, and sold to J. B. Ford, both citizens of the United States, long well-known and esteemed citizens of San Francisco. The vessel is registered 45 tons, by reason of a house above deck, though the real tonnage is about 26 tons. I am the agent of the craft, having sole control; she has been used by me as a pleasure-boat, and in carrying the government officials from island to island, or between the districts, always free to them of charge, and never used as a trading-vessel.

June 4, 1875, this vessel took Mr. S. S. Foster as passenger with his daughters. By agreement he was charged \$100 as passage-money. (*Vide* Doc. F, No. 6, receipt of consul.)

The consul's charge of \$95, extra wages for two seamen who refused to do duty and did desert the ship, and were afterward arrested by Commander Erben, I have not esteemed correct; the men were paid off in full and discharged, though the captain paid the extra wages to the consul under protest. Since that day the captain and myself have been subject to endless petty persecutions. After the return of the Peerless from Tonga, Mr. Foster left a servant on board as a hand. In a short time he had a difficulty with the cook, a Chinaman. The latter was fined \$100 by the consul. I cannot believe the Department will justify such action after reading Docs. F, No. 1; F, No. 2; F, No. 3; F, No. 4; F, No. 5; F, No. 6; F, No. 7; F, No. 8; and F, No. 9, inclosed.

I shall ever esteem it my duty to send to the Department true reports of the condition of these people and the progress of the government.

Having delivered the presents sent by the United States, and conveyed to the Samoan rulers the expressions of friendship and sympathy embodied in my instructions, after reporting upon the country, I esteemed my absolute duties at an end.

The Samoan chiefs had waited nearly two years for my return. Their

confidence was unimpaired. They prayed that I should remain among them; and, consequently, I accepted the position of "Premier" on the 1st day of July, 1875; since which time I have not had an opportunity of forwarding my resignation as an agent of the United States.

I believe my acts will prove in the future for the honor and interests of the United States. America is a synonym of good to the Samoans. While there is a decided feeling of distrust felt toward the German and English, American ships and people are welcomed with joy and confidence.

The government and people would gladly make any concessions to the United States for naval stations or coaling-depots; which, in no way, would be done to any other nation.

The action of Commander Henry Erben, of the Tuscarora, and the others, is deserving of the highest praise. They maintained the dignity of their country, won the approbation of the natives for their every act, and in leaving these islands the people felt that they had parted with true friends.

A large and valuable collection could be made here for the Centennial, which would fairly represent the South Pacific Islands. Some of the best specimens of the Samoans would gladly make the journey, but this could only be done by the United States furnishing transportation and payment of expenses while in America; the Samoan government present could not incur such expenditure.

A scientific corps sent to make a general survey, and to penetrate the interior, would receive every measure of assistance from Samoa, and such facilities as would enable the United States to aggregate a large amount of useful knowledge, as well as the collection of material which would make a creditable museum.

I may I hope that an exposition of facts and a conscientious regard for the truth will merit the approval of the Department.

I have the honor to be, your obedient servant,

A. B. STEINBERGER.

A 1.—*Census of the Samoan Islands for the year ending 1874.*

Islands and nations.	Population 1874.	Population 1863.	Increase in 11 years.	Decrease in 11 years.	Adherents of London Missionary Society.	Adherents of Wesleyan Missionary Society.	Adherents of Roman Catholic.	Mormons.
.....	12,530	12,670	.....	140	8,240	3,410	890	.....
Manono, and Apolima.....	16,568	17,556	.....	988	13,434	1,384	1,750	.....
.....	3,746	3,450	296	.....	3,398	.....	222	126
.....	1,421	1,421	.....	.....	1,421	.....	.....	.....
Total native population.....	34,265	35,097	.....	.....	26,493	4,794	2,852	126
.....	204	.....	.....	.....	.....	.....	.....	.....
.....	236	.....	.....	.....	.....	.....	.....	.....
.....	4	.....	.....	.....	.....	.....	.....	.....
.....	475	.....	.....	.....	.....	.....	.....	.....
Total.....	35,184	35,097	.....	.....	26,493	4,794	2,852	126

....., October 22, 1875.

A 2.—Shipping-list from April 1 to October 18, 1875.—Arrival of vessels in the port of Apia.

Date	Nation.	Rig.	Name.	Captain.	Tons.	Where from.	Cargo.	Date of sailing.	Destination.
1875.									
April 1	U. S. ship of war	Schooner yacht.	Tuscarora	Ehren	1,200	Honolulu	Col. A. B. Steinberger.	May 25, 1875	Honolulu.
7	American.	Bark.	Peerless	Hamilton	45	San Francisco	Half copra.	Apr. 16, 1875	Tutuila.
5	Hamburg.	do.	Curex	.....	675	Line Islands	Ch. J. C. & Son.	May 3, 1875	Hamburg.
14	do.	do.	Alster	Brüha	600	do.	.....	Apr. 12, 1875	Tonga.
18	do.	do.	Saane	Peters	928	Valparaiso	.....	May 12, 1875	Line Islands.
6	do.	do.	Estuine	Beutman	308	Hamburg	.....	May 26, 1875	Line Islands.
13	American.	Schooner yacht.	Peoples	Hamilton	47	Swat	.....	June 4, 1875	Friendleys.
18	do.	Schooner	Ada May	Petersen	87	San Francisco	Lumber and mdse.	June 4, 1875	Tonga.
20	Hamburg.	do.	Santos	Levison	281	Tonga Coast of America.	Copra	June 4, 1875	Quila.
21	do.	Bark.	Papa	.....	550	West Coast of America.	Ch. J. C. G. & Son.	July 3, 1875	Hamburg.
21	English.	Cutter	Satellite	Netzer	25	Suwaroffs.	Beche der mer fungus, and pearl-shell	June 7, 1875	Line Islands.
24	do.	Bark.	Martha	McKenzie	251	Auckland.	General	May 30, 1875	Auckland.
29	U. S. ship of war	Schooner	Louisa Ryder	Ehren	1,200	San Francisco	Put back for coals	May 31, 1875	Honolulu.
2	English.	do.	Leahua	Matheson	26	Fiji	.....	June 12, 1875	Kepella.
8	Hamburg.	do.	Carl and Auguste	Brück	771	do.	.....	June 9, 1875	Tonga.
9	English.	Schooner	Charlybuls	Burrell	94	Hamburg	Ch. R. H. & Co	June 24, 1875	Fiji.
11	do.	Bark.	Metaris	Lyon	244	Auckland.	General	June 17, 1875	Auckland.
12	Hamburg.	Ship	Susanne Godefrey	Fruchtenech	1,371	Sidney	1,320 tons copra	Sept 18, 1875	Liverpool.
12	do.	Bark.	Ethene	Beutman	96	Liverpool	150,000 pounds copra	Sept 18, 1875	Nelson.
14	do.	do.	Upolu	Schmidt	110	Manila	General	July 9, 1875	Savago Islands.
17	do.	Schooner	Adolph	Levison	361	Sidney	.....	Sept 7, 1875	Line Islands.
22	do.	do.	Santos	Levison	361	Tolton	One-half full, copra	July 28, 1875	do.
23	English.	Schooner	Wahia	Black	159	Auckland	General	July 1, 1875	Auckland.
29	Hamburg.	do.	San Francisco	Hamilton	608	Line Islands	90 laborers	July 25, 1875	Nelson.
29	American.	Sch. oner yacht.	Peerless	Hamilton	45	Friendleys	.....	July 31, 1875	Tutuila.
30	English.	Eng.	John Wesley	Mansell	238	Sidney	Missionary ship	July 16, 1875	New Ireland.
30	American.	Schooner	Ada May	Petersen	87	do.	.....	July 7, 1875	San Francisco.
3	Hamburg.	Bark.	Hansa	.....	1,010	San Francisco	Lumber, R. H. & Co	July 3, 1875	Tonga.
3	do.	do.	Armon	.....	1,010	do.	.....	July 15, 1875	do.
16	English.	Schooner	Louisa Ryder	Levison	26	Rio Janeiro	.....	July 25, 1875	Kepella.
21	Hamburg.	Bark.	Ethene	Beutman	308	Kepella	Copra	July 25, 1875	Kepella.
27	English.	do.	Reconnaissance	Wahia	208	Nelson	General	Aug 12, 1875	Manua.
27	do.	Schooner	Peerless	Levison	78	Sydney	.....	Aug 7, 1875	Sydney.
28	do.	do.	George Green	Willcox	930	Auckland	do.	July 31, 1875	Auckland.
28	American.	Ship	Porto	Miller	850	Baker's Islands	Full copra	Aug. 1, 1875	Cork.
28	do.	do.	John Williams	Miller	168	Hamburg	.....	.....	.....
28	English.	Bark.	Godfrey	Thorp	738	Harvey Group	Missionary ship	Aug 16, 1875	Line Islands.
28	do.	do.	Wardman	Stewart	846	Valparaiso	.....	Sept 24, 1875	Friendlya.
30	do.	do.	La Vire	Schmidt	1,700	Manila	.....	Sept 11, 1875	Wallis.
8	French War	Schooner	Upolu	Schmidt	110	Tahiti	.....	Sept. 19, 1875	Mulliana.
11	Hamburg.	Ship	Cleaver Godefrey	Docker	1,035	Sydney	Cattle	.....	.....

Sept 24	do	Ship	Latinsersengen	Kluty	1, 996	Hamburg	Aug. 21, 1875	Tonga
30	do	do	Aelia	Kling	98	Koppels	Aug. 26, 1875	Manua
30	do	Schooner	Maria Ryder	Lawson	944	Tonga	Sept 8, 1875	Sydney
31	English	Bark	Metana	Lyons	606	Nutson	Sept 24, 1875	San Francisco
31	Hamburg	do	San Francisco	Blauk	396	Manua	Oct 9, 1875	Line Islands
8	do	do	Etianna	Beauchan	896	Siberia	Oct 13, 1875	Friendly Is.
17	Russian	Ship	Martin Luther	Schürding	87	Manua	Oct 14, 1875	Do
25	Hamburg	Schooner	Levuka	Micklowin	96	Hamburg	Oct 17, 1875	Nutson
27	do	Bark	John Caesar	Brick	159	Faolailili	Oct 18, 1875	Koppels
27	English	Schooner	Lonlan Ryder	Laurenson	489	Do	Oct 18, 1875	Manua
30	do	Brig	Vision	Laverick	87	San Francisco	Oct 18, 1875	London
30	do	Bark	Shooting Star	Gillis	87	do	Oct 18, 1875	London
18	American	Schooner	Ale May	Petersen	87	San Francisco	Oct 18, 1875	London

I hereby certify the above to be a true copy of the original. In witness whereof I hereunto set my hand and the seal of the Kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS.

Secretary to the Taitumua.

(Copy.)

A 3.—*Copy of license-laws passed on July 26, 1875, and carried into effect on August 15, 1875.*

LIQUOR-LAW.

Whereas the drinking of ardent spirits and other intoxicating liquors and the lawless proceedings of nightly recurrence in the port of Apia is of great injury to the country, subversive of morals, and destructive to our young people, as well as a disregard of public welfare and credit: Therefore,

1. Be it decreed that on and after the 15th day of August we prohibit the selling of all intoxicating liquors, brandy, whisky, gin, beer, wines, and other drinks by retail liquor-dealers, groggeries, and other places of general resort, whether openly or in secret, without special license from the government.

2. Whoever shall be detected violating this law, he shall be fined fifty dollars (\$50) for the first offense and one hundred dollars (\$100) for the second offense, with imprisonment for the term of three (3) months, or labor upon the public roads or works, at the option of the judge.

3. All houses retailing drinks by the glass shall be closed at the hour of ten (10) p. m., each night, and that on and after the 15th of August a gun will be fired at Matantu Point at the hour above named, and a guard patrol the streets to close such houses.

4. On Saturday night all liquor-selling houses shall be closed at seven (7) p. m. and remain closed until six (6) a. m. Monday morning.

5. Drunkenness and all riotous proceedings in licensed houses will be punished by a fine levied upon the proprietor of such house of twenty dollars (\$20) for each such offense.

6. Any house licensed for selling liquors violating these laws shall have their licenses broken, and all orderly people are invited to inform the authorities of such violation.

7. For each house selling above-mentioned liquors, the proprietor shall pay to the government a yearly license of not less than two hundred dollars, (\$200,) payable every quarter in advance, but each house may compete by auction for licenses, the highest bidder in Matantu receiving a license, others to receive licenses at the rate of the highest bidder in each town, the same in Apia and Matafelo, but no bids accepted under two hundred dollars (\$200) per annum.

8. The same law to govern each and every retail seller of liquor or public houses in every part of Samoa.

9. The bids will be openly received at the government house, at Mulinu, at 12 m. on Friday, the 13th of August, and licenses given in accordance with above laws.

Amendment made on the 30th July on the section 4:

On Saturday nights all liquor-selling houses shall be closed at 10.30 p. m., and remain closed until 6 p. m. Monday morning.

I hereby certify that the foregoing is a true copy of the law as taken from the government records.

In witness whereof I have hereunto set my hand and affixed the seal of the government of Samoa, this 18th day of October, A. D., 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary.

Duty-law.

A 4.—*Copy of the duty-law passed on the 24th of August, 1875, and carried into effect on the ——— August, 1875.*

Whereas the importation of spirituous or alcoholic liquors are pernicious to society, destructive to the morals and health of our people; and

Whereas it is a source of profit to the importer as well as the vendor: Therefore, *Be it enacted and decreed*, That on and after the twenty-fifth (25th) day of August, 1875, there will be levied, collected, and paid upon all distilled spirits, cordials, and liquors, an import duty of—

1st. Five (\$5) dollars on each and every case of gin, no case to contain more than fifteen (15) bottles of not more than a quart each.

2d. Four (\$4) dollars on each and every case of brandy containing not more than twelve (12) bottles.

3d. Five (\$5) dollars on each and every case of twelve (12) bottles of American, Irish, and Scotch whisky.

4th. One (\$1.50) dollar and fifty cents per gallon upon all spirits in kegs, casks, barrels, or other vessels, not heretofore specified, brandy, cordials, whisky, rum, gin,

ck, liquors, bitters, alcohol, spirits of wine, and all other spirituous liquors of every description or whatever name.

h. It shall be the duty of the collector to make estimate of the number of gallons packages of bitters, cordials, liquors, and other spirits not provided for in sections (1,) two, (2,) and three, (3.)

h. Duties on the above-mentioned goods shall be paid or secured to be paid before permit shall be granted for landing or transshipping them.

h. Every bond entered into for payment of duties by a member of a firm or agent the name of such firm shall bind the other member or members of such firms equally to the party who shall have executed such bond.

h. No clerk or hired person in the employment of another shall become surety to bond to which his employer is a party.

h. It shall be the duty of the collector to affix a government stamp upon every cask, or barrel of spirits upon payment of duties on making bond.

th. The ports of entry in the kingdom for foreign vessels for the landing of above-mentioned articles shall be Apia, in Upolu; Leone, in Tutuila; and Matautu, in Savaii. However, not to apply to coasters having liquor on board, duty paid, at either of the ports.

th. It shall be the duty of the collector of the port of Apia to appoint agents and collectors in the ports of Leone and Matautu.

hereby certify that the foregoing is a true copy of the law as taken from the government records.

witness whereof I have hereunto set my hand and the seal of the government of Samoa, this 22d day of October, A. D. 1875.

EAL.]

THOMAS WILLIAM WILLIAMS,
Secretary.

—Letter from the members of the London Missionary Society in Samoa, in answer to Colonel Steinberger's to them requesting their ideas on different government matters, June 12, 1875.

SAMOA, June 12, 1875.

Colonel A. B. STEINBERGER,

United States Commissioner to Samoa:

DEAR SIR: With reference to your letter of May 5, 1875, addressed to the members of London Missionary Society residing in Samoa, we beg to say we cannot give you an oral reply upon the points which you mention until a general meeting of our mission is held; but believing that you will wish to act on some of the points on which you give your opinion before such a meeting can be held, we take upon ourselves the responsibility of presenting at once a non-official reply, which embodies the views of those of whose names are undersigned. We feel that the duties and responsibilities which have assumed by accepting, at the request of the Samoans, the task of establishing a permanent government for this group of islands are extremely onerous.

We pray that you may be able to establish and carry out such institutions and laws which shall permanently benefit the Samoan people and develop the resources of their country. We also assure you that we shall ever be ready in the future, as we have been in the past, to aid the Government in any way in which our help may be required, and as such aid may be consistent with the position we occupy as ministers of the Gospel and with the principles we hold, viz:

A FREE CHURCH IN A FREE STATE.

We will give you notice, seriatim, the points mentioned in your letter, and give our opinions and reasons on each.

One of us will endeavor, for a time at least, to act as interpreter between yourself and the Samoan members of the government at all the important meetings, provided notice be given to us so that we may make our other engagements fit in.

With regard to your request for the use of our printing-office, press, type, &c., we are prepared to make two proposals to our mission: (a) That we sell to the government, at a moderate price, the site, building, and entire stock, if the government be prepared to purchase the whole; or (b) that we allow the government to use the site and materials for printing such documents as may be wanted immediately, provided that the government finds and pays for all the labor, and meets all expenses or charges to our mission-property; provided, also, that the government takes the entire responsibility upon itself as to the execution of the work, &c.

(a) For national coat-of-arms, we would suggest shield-argent, with Bible, and a crown, (Savaii, Maunono, Upolu, Tutuila, and Manna—signified by the five rays.)

A crown be adopted, perhaps it would be best plain, and with a cocoa-palm as

crest. Scroll with motto, "E faatumanina le Malo i le Amiotonu." (the kingdom is established or continued by righteousness.) Supporters, the two birds peculiar to the group, a manuma (*Didmiculus strigirostris*), and a punaé, (*Parendiastes Pacificus*.)

If more be required to fill in, in place of drapery, two cocoa-nut palms with full drooping foliage at back of shield and crown. (b) For King's private seal, shield-argent, with Bible, and star-azure, (the national symbol as founder of the monarchy.) Scroll with motto, "Olan Afoga, a lóu malamalamalea," (Thy word is my light.) (c) If it be deemed advisable to establish a Royal Order, we would suggest that *one national order* should be found by the King instead of one of *Malietoa*, the objection to which (and we think it a strong one) is that it would not serve for another family. The order we would prefer would be, say, "The order of the Tupu of Samoa." To this let the national coat-of-arms be attached.

4. We shall be happy to give our moral support to any laws which aim at regulating and, as far as possible, suppressing the sale of spirituous liquors. The amount you name as duty on gin, and for licenses, we think would not be too much.

We would call attention to the fact that great mischief arises from the sale of spirits by traders in various parts of the group; some carry it on board their vessels as regular "trade." We think all such vendors should be required to have licenses.

We shall be glad to hear that you succeed in getting grog-shops closed at 6 p. m., on Saturday, as you propose, and with the other business houses all day on Sunday.

5. We would also heartily support the most rigid measures to suppress prostitution, and would approve of the Hawaiian law which prohibits women belonging to other villages from living in the neighborhood of a port for purposes of prostitution.

6. We have already acted on your suggestion, and have advised the King to adopt, as fast as he can, a style of dress becoming his position; to try and obtain from the government a house in which he could live with his family in a style suitable to the King of the entire group. He received our advice in good part, and promised at once to attend to it.

7. We have considered your proposal that a member of our mission should be on the commission to investigate the condition, &c., of the imported laborers on the German plantations. We shall be most happy to do all in our power to aid in such an investigation as that now proposed; but it is our opinion that we shall best do this by one of our number attending as an extra member of the commission, without a vote. In such a position a missionary could see that the complaints of the laborers are properly translated and explained to the commission, and in many ways facilitate investigation.

Mr. Whitmer will be prepared to join the commission, which is about to investigate the complaints of the laborers at Mulifanna in such a capacity.

8. The marriage question is not included in the subjects mentioned in your letter; but in conversation you expressed a wish to have our opinion on this also. We desire, (a) That since marriage has, in many instances, been extremely lax in the past, the government should demand the registration of all couples living together as man and wife, who have not been registered and married under the present law.

We would suggest that a date be fixed within which such registration must be made, and that the registration fee be very small, so that none may have the excuse of inability to procure the money wherewith to pay it.

(b.) As we fear the registration under the present law has not been systematically performed, that a revision of the registrations be made, and the whole collected into a proper book by a registrar-general.

(c.) That the present marriage regulations (or similar revised regulations) be strictly carried out; and especially that none be permitted to tamper with the law under the pretense of "religious liberty." We know of a recent case in which the Roman Catholic bishop forbade a woman to live with her husband (to whom she had been married according to the law by a Protestant native minister) unless he submitted to baptism from a Roman Catholic priest, and to be remarried according to Roman Catholic rites.

We know of another case in which a Roman Catholic priest offered to release a man from his marriage according to Protestant forms, and remarry him to another woman, on condition of his turning Papist.

Reciprocating all your kindly expressions,

We remain, dear sir, sincerely yours,

G. S. J. WHITMER.
GEORGE TURNER.
HENRY NISBET.
GEO. A. TURNER.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have herenunto put my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—Copy of letter of instructions from the Premier to the respective governors, September 16, 1875.

GOVERNMENT HOUSE,
MULINUU, September 16, 1875.

His Excellency TUALA TAUSULUI,
Governor of *Itu o Tane Savaii* :

HERewith find inclosed your commission, signed and sealed, as chief executive of the district of the *Itu o Tane*, island of *Savaii*.
You will find also inclosed, sealed and signed, commissions to *Tuailemapia Saisau* and *Foaimea*, judges of your district, which you will at once deliver.
Each officer thus commissioned will, upon receipt of above-named documents, subscribe to the usual oath to support the constitution, the laws, and His Majesty the King of *Samoa*, the oath to be administered by some judge or magistrate.
Yourself and the two appointed judges will constitute a high court for all cases and the jurisdiction of the magistrates of subdistricts.
The high court will at once appoint four magistrates for the district of the *Itu o Tane*, so located as will best divide the area and population.
You will, with the appointed judges, fix the dividing line in your district between the jurisdiction of the two judges.
You are commanded to co-operate with the governors and judges of the *Faasalea* and the *Itu o Fafine*, and use your joint efforts to fix the boundary-line between the respective districts, and report the result to the government at *Mulinuu*, with all the coast points and general direction of lines, so far as can be done in the absence of regular surveys.
The jurisdiction of the magistrates of the subdistricts shall not extend to cases involving more than \$100.
The chief judges, at discretion or upon demand of a prisoner arrested for murder, treason, or other grave offenses, shall grant a jury-trial.
Such laws, rules, and regulations as now exist in the *Itu o Tane*, shall be in full force until such laws are made and old ones repealed.
Copies of all laws will be furnished your excellency for general promulgation.
You will instruct the judges and the magistrates that in all trials the parties to the case must obligate themselves to pay the costs of trial, (loser paying costs,) and such costs to be at the option of the judge or magistrate.
The governor is to exercise a general supervision of his district, of judges, magistrates, policemen, and all other officers.
You will appoint policemen, sheriffs, and such other employes as the public service may require and your judgment approve.
In this connection you are especially enjoined to prevent arbitrary arrests or any other and disorderly conduct upon the part of the policemen.
No arrests can be made without an order from a magistrate, except in extreme cases, where life and public property are in peril.
You will exercise especial vigilance to see that private rights are respected, as much as the complaint, and justly so, of foreigners, comes from the fact that native officers, to their position, are apt to assume powers which do not exist by law.
You will, as soon as possible, have forwarded to the government at *Mulinuu* a true and correct statement of affairs in your district, with full accounts from the treasurer of money on hand and money due. Such statements will be required every quarter.
The chief judges will cause regular statements of moneys received and expended, and the balances, to be furnished the treasurer every quarter.
No taxes will be imposed upon the people within your jurisdiction except by the general government at *Mulinuu*.
Laws as made and passed by Parliament will be forwarded you; also full and complete instructions accompanying for your guidance.
Any attempt to make local laws in opposition to acts of Parliament will be viewed as rebellion and insurrectionary in spirit.
The compensation for all officers will be fixed by law, of which you will be officially notified.
Holding one of the most important positions under the government, it is expected of you that you will use diligence and dignity in the exercise of your high duties, and every officer will be governed by an integrity of purpose and rectitude of action, that you will preserve such a general deportment as will befit the government of the *Itu o Tane*.
With prayers for a wise and successful administration of your affairs,
I have the honor to be your obedient servant,

STEINBERGER.
Premier.

I hereby certify that the foregoing is a true copy of the original.
In witness whereof I have hereunto set my hand and the seal of the kingdom of *Samoa* this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the *Taimua*.

A 7.—*Recognition by the Hawaiian government of the Samoan Kingdom, July 16, 1875.*

TO THE TAIMUA OF SAMOA—*Tagaloa, Fuaataga, Mataafa, Lemana, Faupau, Faatuono, Letufuga, Mautautia, Misa, Samoa, Tuia, Aufai, Asiata, Lavaea, Tia :*

GREETING: I, Kalakaua, King of the Hawaiian Islands, having duly weighed and considered your request dated March 19 last, addressed to me, to be acknowledged as a nation among the nations of the earth, do now, with sentiments of great affection and respect for the government and people of Samoa, hereby acknowledge the said government and people of Samoa; and I now solemnly place my hand and the seal of my kingdom to this acknowledgment, and I pray that God may long preserve them among the nations of the earth.

Done at Iolani Palace, Honolulu, Oahu, the 16th day of July, 1875, and the second year of our reign.

KALAKAUA, K.

By the King:

W. L. GREEN,

Minister for Foreign Affairs.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary to the Taimua.

A. 8.—*Letter from the King Malietoa I to President Grant, October 19, 1875.*

KING'S PALACE,

Mulinu'u, October 19, 1875.

To your Highness, President of the United States of America, greeting:

I now write to your Excellency, so as to give you some ideas of our government in Samoa.

Mulinu'u is the capital of Samoa; the laws of our government are established there.

We have formed two houses, the house of lords (Taimua) and the house of commons, (Faipule.) These two houses make all the laws for Samoa.

We have appointed for our various districts governors, judges, magistrates, and other officers.

I, and all the chiefs and people, are very pleased with the laws, because by the laws we know what is bad. It is not good if people are let have their own way in badness.

We are very thankful that Colonel Steinberger, the premier, has arrived here; it is like the love of God to our country. Our wish is still to have this gentleman with us, because these people are so obstinate. Now the darkness is passing, the sun is rising, and the people are getting clearly to understand laws.

We are very pleased with this wise and kind-hearted gentleman. The Samoans sympathize with him on account of his very hard work. He has no rest from teaching us all things, so that we might all become wise.

There is another thing I want to mention to your highness.

There are a number of white men from different countries who have lived in Samoa for many years, who are spreading bad reports against the Samoan government and the premier. Some white men are angry because the premier has not given them any offices. Notwithstanding their hinderance, slander, and spreading reports against this gentleman, we pay no heed or attention to them.

This is my desire, that I will communicate to you, the President of the United States, and Congress, that Colonel Steinberger, the premier, remain in our country until his death, and that you will respect his work of love to the Samoan government, and that this country may still prosper, and that all the great nations may protect it.

This is all my letter to your Excellency, the Highest Chief.

May God Almighty make you prosper.

I am,

MALIETOA I.

I hereby certify that the foregoing is a true translation of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 30th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary and Interpreter to the Taimua.

9.—*Alfred L. Poppe, acting German consul, to Col. A. B. Steinberger, premier of the kingdom, commending the actions of the Samoan government.*

GERMAN CONSULATE,
Apia, October 21, 1875.

SIR: In reply to your note of 18th instant, I take great pleasure in stating that of late have noticed a decided improvement in the dispatch and settlement of complaints German subjects brought by me before Samoan judges.

The action of the government in this and other matters is deserving of my best commendation, which I take this opportunity to offer.

I have the honor to be, sir, your obedient servant,

ALFRED L. POPPE,
Acting German Consul.

Hon. Colonel STEINBERGER,
Premier, Taimua of Samoa.

hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—Colonel Steinberger, premier of the kingdom, to the three foreign consuls, and Messrs. Ruge Heidemann & Co., of Apia, in reference to choice of a pilot.

GOVERNMENT HOUSE,
Mulinnu, July 31, 1875.

ENTLEMEN: As it is the purpose of the Government to appoint a pilot for the harbor and port of Apia, will you be pleased to signify your desire as to the proper party and capabilities?

The government is pleased to consult the wishes and views of those most interested in this as well as other matters concerning the interests of foreigners.

I have the honor to be your obedient servant,

STEINBERGER,
Premier.

Hon. ALFRED L. POPPE,
Acting German Consul.

Hon. S. S. FOSTER,
United States Consul.

Hon. S. T. WILLIAMS,
H. B. M. Acting Consul.

MESSRS. RUGE HEIDEMANN & CO.

hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—Alfred L. Poppe, Acting German Consul, to Colonel Steinberger in reference to the choice of a pilot.

GERMAN CONSULATE,
Apia, August 21, 1875.

SIR: I herewith beg to return the papers about the pilot for the harbor and port of Apia, on which you have done me the honor to consult me.

I quite agree with the views contained in Mr. Hamilton's letter, and strongly recommend him to be continued in his employment, which he has fulfilled for so many years to the entire satisfaction of everybody concerned in the shipping-trade of this port.

Your obedient servant,

ALFRED L. POPPE,
Acting German Consul.

Hon. Colonel STEINBERGER,
Premier of the Samoan Kingdom.

hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary of the Taimua.

B 3.—S. S. Foster, *United States consul, to Colonel Steinberger, in reference to the choice of a pilot.*

UNITED STATES CONSULATE,
Apia, August 21, 1875.

Sir: Your favor of the 31st ultimo did not reach me until after your departure for Tutuila.

In regard to my choice who is the proper "party for pilot for the harbor and port of Apia," I would answer, I have no individual preference, and I feel certain that you will act solely for the public good.

I believe there are three persons well qualified to act as harbor-master and pilot, viz, E. L. Hamilton, the present incumbent, J. M. Coe, esq., and Capt. George Hamilton.

I have no doubt that the public at large would be satisfied with either of these gentlemen, provided no one of them entered into a commercial business, so as to give them an undue advantage over other merchants and traders by boarding a vessel first and securing the most salable parts of every cargo coming in.

I have the honor to be, sir, your obedient servant,

S. S. FOSTER,
United States Consul.

Col. A. B. STEINBERGER,
Premier of the Samoan Kingdom.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

B 4.—S. T. Williams, *Her Britannic Majesty's Acting Consul, to Colonel Steinberger, in reference to the choice of a pilot.*

BRITISH CONSULATE,
Apia, August 3, 1875.

Sir: I have the honor to acknowledge the receipt of yours of the 31st ultimo, requesting me to name the person I desire as pilot of this port, and his capabilities.

In reply, I am unable to state the capabilities of any person, but I would propose that candidates send in their applications, and that a board selected by the Samoan government decide on the person most fitted for that capacity.

I have the honor to be, sir, your obedient servant,

S. T. WILLIAMS,
Her Britannic Majesty's Acting Consul

Col. A. B. STEINBERGER,
Premier, Mulinu.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

B 5.—Messrs. Ruge Heidemann & Co. to Colonel Steinberger, in reference to the choice of a pilot.

MATAUTU, August 2, 1875.

To the Samoan Government, Mulinu:

GENTLEMEN: In reply to your favor of the 31st of last month, it is our opinion that Mr. E. L. Hamilton of this place, by the long experience he has had, would be the most capable and best pilot of Apia harbor.

Allow me to remain, gentlemen, yours, very truly,

pp. RUGE HEIDEMANN & CO.
C. JULIUS NEIBHUR.
F. HUGO HEIDEMANN.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—S. S. Foster, *United States consul, to the Taimua, requesting a recognition of himself from them.*

UNITED STATES CONSULATE,
Apia, January 28, 1875.

the Taimua of Samoa, greeting :

have removed from Matautu to Matafele, where the business of the United States consulate will be done in future.

would thank the high chiefs of the Taimua to send me the letter for the Great Chief in America, that I can send it to him to show the day I was officially recognized as United States consul by the Taimua composing the government of Samoa.

I am, truly, yours,

S. S. FOSTER,
United States Consul.

hereby certify that the foregoing is a true copy of the original.

witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary of the Taimua.

—S. S. Foster, *United States consul, to the Taimua, respecting rent demanded by J. M. Coe for land.*

UNITED STATES CONSULATE,
Apia, March 18, 1875.

the TAIMUA AND RULERS OF SAMOA :

send to your lordships, by the request of Mr. J. M. Coe, a letter in regard to some of lands claimed by him on Mulinu Point.

your lordships can send me an answer that you have received Mr. Coe's letter.

may your lordships live.

S. S. FOSTER,
United States Consul.

hereby certify that the foregoing is a true copy of the original.

witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—S. S. Foster, *United States consul, to the Taimua, informing them of receipt of letter from Hon. Hamilton Fish.*

UNITED STATES CONSULATE,
Apia, March 24, 1875.

the TAIMUA of the Samoan government :

CHIEFS: This is my letter to your excellencies. I wish to inform you that I received a letter from the honorable Hamilton Fish, Chief Secretary of the American Government, directed to J. M. Coe, esq., late United States commercial agent, in answer to his letter in August, 1874.

hereby send a true copy of that letter so that your excellencies may know what has been written to Mr. Coe.

may your excellencies have health.

I am,

S. S. FOSTER,
United States Consul.

hereby certify that the foregoing is a true copy of the original.

witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

of letter from the honorable Hamilton Fish to J. M. Coe in regard to Colonel Steinberger.

DEPARTMENT OF STATE,
Washington, November 14, 1874.

JOHNAS M. COE, Esq.,

Late Commercial Agent of the United States, Apia :

RE: Your dispatch of the 28th of August last, No. 53, has been received.

In reply, I have to state that Col. A. B. Steinberger was appointed a special agent to inquire into and report upon the condition and resources of the Samoan Islands.

He was not authorized to make any treaty with the authorities of those islands or in any way to pledge this Government for the protection of that group.

I am, sir, your obedient servant,

HAMILTON FISH.

I hereby certify the above writing is a true copy of the original.

March 24, A. D. 1875.

S. S. FOSTER,
United States Consul.

I hereby certify that the above is a true copy of the copy furnished by S. S. Foster, United States consul.

October 27, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 4.—S. S. Foster, *United States consul, to the Taimua, respecting various cases, John Lee, &c.*

UNITED STATES CONSULATE,
Apia, March 26, 1875.

To the TAIMUA of the Samoan government:

CHIEFS: I send to your excellencies 4 dollars taxes, being for myself and oldest boys, and one servant from Tutuila, that is living with me.

I will make out a list of the fines that I wish you to pay into this office. Some of them have already been paid in to your Samoan judges, and the money kept from the Americans that it belongs to.

I shall call on you to look into that case of Mr. Lee, the cooper at Aliepata; for the persons that tied up his young men and kept them prisoners must be punished.

I will make these cases all known to you as soon as your new government has got through collecting the taxes and adopted the new constitution.

May your excellencies all have health.

I am,

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my name and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 5.—S. S. Foster, *United States consul, to the Taimua, informing them of the sitting of the naval court of inquiry.*

UNITED STATES CONSULATE,
Apia, April 2, 1875.

To the TAIMUA of the Samoan government:

CHIEFS: I have to inform your excellencies that a court will meet at my office April 3, at 10 o'clock a. m., to decide all cases in dispute in regard to claims of American citizens against Samoans, and that the title to the land at Mulinnu in dispute between you and J. M. Coe will be tried first.

I hope your excellencies will be present with your witnesses to prove your right to the land.

May your excellencies live.

I am,

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—S. S. Foster, United States consul, to the Taimua, informing them that J. M. Coe demands \$50 rent per month for his land.

UNITED STATES CONSULATE,
Apia, May 1, 1875.

the TAIMUA of the Samoan government :

YOUR EXCELLENCIES: I have been requested by J. M. Coe, esq., to notify you officially through this office that he demands of your excellencies, the Taimua of the Samoan government, the sum of fifty dollars (\$50) per month, for rent of the land "Soni" that he purchased from Toomalatalai on the first day of June, 1874, the rent to commence this day, May 1, 1875.

May your excellencies have health.

I am,

S. S. FOSTER,
United States Consul.

whereby certify that the foregoing is a true copy of the original.
a witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—S. S. Foster, United States consul, to the Taimua, inclosing copy of letter from J. M. Coe, regarding land at Mulinuu.

UNITED STATES CONSULATE,
Apia, May 17, 1875.

TAIMUA of the Samoan government :

YOUR EXCELLENCIES: I addressed a note to the Taimua on the first day of May, regarding the request of Mr. Coe.

On the 15th of this month I received another letter from that gentleman, a copy of which is here inclosed, that has, according to law, to go through this office.

Official courtesy at least requires from you an answer whether you have received it. I do not ask for your comment on it.

May your excellencies have health.

I am,

S. S. FOSTER,
United States Consul.

whereby certify that the foregoing is a true copy of the original.
a witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

—J. M. Coe to S. S. Foster, United States consul, requesting payment of rent from the Samoan government for using his land.

MATAUTU, APIA, May 15, 1875.

FOSTER, Esq.,
United States Consul, Apia :

SIR: I have the honor again to communicate with you relative to my letter under date of May 1, 1875, wherein I respectfully requested you to notify the Taimua of the Samoan government at Mulinuu that I now require them to pay rent from the aforedate, at the rate of \$50 per month, for the occupation of my land known as "Soni." Will you kindly inform me if you have notified the Samoan government of the same, and what is their reply?

I have the honor to be, sir, your obedient servant,

JONAS M. COE.

whereby certify the above to be a true copy of the original in my possession.

S. S. FOSTER,
United States Consul.

whereby certify that the foregoing is a true copy of the copy furnished by S. S. Foster.

a witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

REAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 8.—*L. Foster to the Taimua, telling them of S. S. Foster's non-attendance on account of sickness.*

May 18, 1875.

GENTLEMEN: This is my letter to your excellencies to inform you that Mr. Foster is unable, through sickness, to go to Mulinu by and bye.

May your excellencies prosper.

I am,

LUCIA FOSTER.

To the FOURTEEN TAIMUA OF SAMOA.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

9.—*S. S. Foster, United States consul, to the Taimua, requesting them to take steps to punish the people who broke into Wm. Henry's house.*

UNITED STATES CONSULATE,
Apia, May 21, 1875.

YOUR EXCELLENCIES: I have been informed by Wm. Henry that his house was broken open Monday night, May 17, and eight bottles of liquor and \$4 cash was taken; and that he suspects William Barron and John Bruce, two colored men, for the theft, as one of your police-officers, Toga by name, saw these two men carrying off liquor that night.

As you have now a good government, it is your business to look into this affair and punish the offenders.

May your excellencies have health.

I am,

S. S. FOSTER,
United States Consul.

To the TAIMUA, of the Samoan Government:

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 10.—*S. S. Foster, United States consul, to the Taimua, informing them of the decision of the court against H. C. Edwards.*

UNITED STATES CONSULATE,
Apia, June 1, 1875.

To the Taimua of the Samoan Government:

YOUR EXCELLENCIES: I have the honor to inform you that at a trial held this day by the United States consular court, that a man called Henry C. Edwards, that formerly kept a drinking-saloon opposite the store of Mr. D. S. Parker, was fined for contempt of court, and the following resolution was passed unanimously:

"It is also our opinion that the reports set in circulation by said Edwards, owing to his not appearing to substantiate the same, are mere idle fabrications, and, as such, should be regarded unworthy of belief."

This man is therefore guilty of slander, and my wish, therefore, is to you that you do not permit him to leave the island until this fine is paid, and that you also warn all Samoans that there is no believing anything he says.

May your excellencies have health.

I am,

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

- 11.—S. S. Foster, United States consul, to the Taimua, respecting the arresting of Alfred Smalley and John Johnson.

UNITED STATES CONSULATE,
Apia, September 13, 1875.

to the Taimua :

YOUR EXCELLENCIES : I wish to call your attention to another outrage committed on American citizens on Sunday last, September 12th, at the town or near Lalovia, on the land of Mr. A. Craig, and in his presence and that of his wife.

Alfred Smalley was stopped, and prevented going farther until night, and an attempt was made to put him in irons, as usual in these arbitrary arrests ; he resisted and prevented them ; however, he and his crew were detained, and thus lost the carrying of a passenger.

John Johnson had just arrived home after his first illegal arrest and sending here, and was again arrested and put in irons, although he showed my paper, with the seal of the United States, for his protection.

I have had many complaints, which I have placed on record, waiting until your excellencies had completed the laws that I have understood you were making ; but these continual outrages on the rights of American citizens are intolerable and no longer to be borne ; and I wish these two cases of Alfred Smalley and John Johnson be brought forward immediately, as leniency or longer delay only has the effect to produce fresh outrages.

I claim damages as well as punishment against the Samoan native Tapuvae and all concerned in making arrests of these persons.

For preventing A. Smalley from proceeding on his journey, and thus stopping boat and crew and losing a passenger. For twice putting John Johnson in irons, and disregarding the protection of the United States, as shown by him.

I shall also, in a short time, present your excellencies with a list of cases for adjudication that has been already too long delayed, and which I shall not pass over in silence, especially that of Mr. John Lee, of Aliapata, which your excellencies have already had cognizance of and failed to bring the offenders to justice.

May your excellencies have long life.

I am, &c.,

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

- 12.—S. S. Foster, United States consul, to the Taimua, making a protest against the government assuming power.

UNITED STATES CONSULATE,
Apia, September 25, 1875.

to the Taimua of the Samoan Government, greeting :

I hereby make known to your excellencies that I, Samuel S. Foster, consul of the United States for Samoa and the Friendly Islands, do make this my solemn protest against your assumption of power, interfering with the rights and privileges of this consulate, in absence of any treaty with the United States, in arresting American citizens and trying them without bringing them before me.

And I do further enter my solemn protest against your interference with the rights and privileges conferred on me by my Government for trials of offenses and misdemeanors committed by officers and seamen on board of American vessels.

And that I hold you responsible in damages for all wrong committed and defiance to the laws of the United States, as given me for my guidance and support.

Given under my hand and seal of this consulate, at Apia, this 25th day of September, D. 1875.

[OFFICIAL SEAL.]

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

S. S. Foster, United States consul, to the Taimua, stating various cases of the arrest of Americans.

UNITED STATES CONSULATE,
Apia, September 25, 1875.

YOUR EXCELLENCIES: I wish to call to your attention certain abuses and arbitrary assaults and assumption of power by some of your Samoan officials, not warranted by your own laws or recognized by the foreign consuls, and especially where it concerns American citizens.

I have waited a long time, as announced to you before, and especially of my letter of the 13th instant, in the arrest of Alfred Smalley and second arrest of John Johnson, thinking you were making new laws and would soon remedy these abuses, but this delay, instead of correcting or stopping these constant recurring violations of the rights of American citizens, only induces fresh aggravations.

I wish now for your excellencies to remedy these abuses and forbid their recurrence in future; and that you may act knowingly in the matter I will state some of them, some of which you have already had cognizance of and passed over in silence, especially the case of John Lee, of Aliepata. The parties in this outrage must be punished and Mr. Lee indemnified for his time and losses.

There was a William Williams, American, ordered off of his land without judgment or warning or giving me notice.

The wife of Robert Wright, American, was arrested and fined without bringing before me.

On September 10th comes another complaint; a John Johnson, American, was illegally arrested at Lalovi and put in irons.

September 11th comes another complaint from Tutuila under the new form of government. The wife of John Rees was arrested and fined, and the consular officer stationed there forbid to interfere.

Again, September 12th, at the same town of Lalovi, two Americans, Alfred Smalley and John Johnson, were illegally arrested.

John Johnson had only arrived at his home on Sunday, and had not time to go into his house when he was again arrested, and, according to the usual Samoan custom, put in irons, although he showed a paper from me with the seal of the United States promising him protection according to law.

Your excellencies have not compelled the chief to fulfill his obligations that Mr. Williams, the British consul, and myself wrote to you about, or answered our letter, neither have you compelled the fines to be paid passed upon by your own judges before Mr. Coe.

It is not only my wish to call your attention to this long list of grievances still undressed, but to state for your future guidance, so far as it concerns American citizens, the position you occupy in relation to them and the American Government through their only legal and recognized commissioned representative of the United States known here, the United States consul.

I am instructed and fully empowered by laws of the United States to have exclusive jurisdiction over American citizens residing on these islands, both in civil and criminal cases, and from which there is no appeal, and I shall continue to protect the rights and interests of American citizens according to these instructions and the laws of the United States so far as they may be applicable to the case, and if there is no law to suit the case, then, in justice and equity and the right of the matter.

Until I am officially informed by my Government that they have recognized you as one of the civilized nations of the earth and negotiated a treaty with you defining your powers and jurisdiction, and manner of procedure in trials where citizens of the United States are concerned, the status of American citizens will remain the same on these islands under the new government as it did under the old or the chieftainship.

In future, any arrests of American citizens or their wives or children, or trials or judgments contrary to the laws of the United States, as herein prescribed, are null and void and will not be recognized by me, and on this basis, as before, my official intercourse will be conducted by me with your government.

I would further ask, in order to lay before my Government at as early a date as possible, whether it is in your intention to remedy these abuses again brought to your notice, as you done formerly under the old laws?

Whether it is your intention, when called upon by the American consul, to arrest a criminal that has violated the laws of the United States?

Whether it is your intention to give aid and assistance when called upon by the American consul to carry into execution the decisions of a consular court?

Whether it is your intention to arrest deserters from American vessels when called upon by the American consul, he defraying the expense of the same?

I wish a categorical answer to the above questions at your earliest convenience, as my Government will then know whether you intend to extend the usual comity of all nations wherein the United States have a representative.

An answer to these questions will also govern my actions in future, as the duties of

each government and its officers are reciprocal in carrying out each other's laws and judgments for the suppression and punishment of crimes and misdemeanors.

May your excellencies live.

I have the honor to be your most obedient servant,

S. S. FOSTER,
U. S. Consul.

To the honorable the TAIMUA of the Samoan Government.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 14.—Colonel Steinberger to S. S. Foster, United States consul, in answer to his letter stating various grievances against the Samoan government.

GOVERNMENT HOUSE,
Mulinuu, October 9, 1875.

SIR: Your several communications, receipts of same acknowledged on the 28th ultimo, have been the subject of earnest deliberation. All of your letters now on file have been carefully considered, and we find—

1st. Your letter to the "chiefs and rulers of Samoa," January 9, 1875, notifying them of your appointment of E. L. Hamilton vice-consul during your absence, visit to Tutuila.

2d. Your letter to the "Taimua of Samoa," January 29, 1875, notifying them of your removal from Matautu to Matafele, and asking for their "letter to the Great Chief in America, that I can send it to him to show the day I was officially recognized as the United States consul by the Taimua composing the government of Samoa."

3d. Copy of your letter to D. S. Parker, March 2, 1875, appointing him vice-consul of the United States, and to act as marshal for the same to receive from Wm. Allen or Alfred Smalley, property, &c.

4th. Copy of D. S. Parker's reply to the Hon. S. S. Foster, March 2, 1875.

5th. Your letter to the "Lords Taimua and all their excellencies of the government of Samoa," relative to the appointment of D. S. Parker as an officer of the United States to search Allen's house, March 3, 1875.

6th. Your letter to the "Taimua and rulers of Samoa," March 18, 1874, transmitting letter from J. M. Coe, relative to the claim for rents of land on Mulinuu Point.

7th. Your letter to the "Taimua of the Samoan government," March 24, 1875, notifying them of the receipt of a letter from the Hon. Hamilton Fish to Mr. J. M. Coe, in answer to his letter of August, 1874.

8th. Your letter to the "Taimua of the government of Samoa," March 26, 1875, remitting annual taxes, and notifying them of intention to make a list of fines claimed to be due the consular office.

9th. Your letter to the "Taimua of the Samoan government," April 1, 1875, informing them of the arrival of Colonel Steinberger, and appointing time of meeting.

10th. Your letter to the "Taimua of the Samoan government," April 2, 1875, notifying them of a court to be held at the consular office April 3, "to decide claims of American citizens against Samoans and the title to the land on Mulinuu claimed by J. M. Coe."

11th. Your letter to the "Taimua of the Samoan government," May 1, 1875, informing them of the demand of J. M. Coe for rental of Mulinuu.

12th. Your letter to the "Taimua of the Samoan government," May 17, 1875, again calling their attention to Mr. Coe's claim.

13th. Mrs. S. S. Foster's letter to the "fourteen chiefs appointed Taimua at Mulinuu."

14th. Your letter to the "Taimua of the Samoan government," May 21, 1875, calling attention to a robbery in the house of William Henry on the 17th instant.

15th. Your letter to the "Taimua of the Samoan government," June 1, 1875, informing them of a consular trial of H. C. Edwards and his being fined for contempt of court.

16th. Your letter to the "Taimua of the Samoan government," June 3, 1875, informing them of the assault made upon the Hon. S. S. Foster by H. C. Edwards.

17th. Your letter to Col. A. B. Steinberger, June 3, 1875, asking consultation as to Edwards.

18th. "Consular Order," with seal, June 3, 1875, authorizing any of the Samoan police to enter the houses of Americans and arrest H. C. Edwards.

19th. Your letter to Col. A. B. Steinberger, asking his aid with the Samoan government in arresting Edwards and Woodworth, June 4, 1875.

20th. Your letter to the "Taimua of the Samoan government," July 6, 1875, asking that a warrant be issued for the arrest of J. P. Woodworth.

21st. Your letter to the "Taimua," September 13, 1875, calling their attention to outrages perpetrated on two American citizens, Alfred Smalley and John Johnson, on the 12th instant, also claim of John Lee, of Aliapata.

22d. "To the honorable the Taimua of the Samoan government," September 25, 1875, late voluminous letter of complaints, &c.

23d. Your "solemn protest" to the Taimua of the Samoan government against the Samoan government, September 25, 1875.

I recapitulate in detail your letters that you may know there can be no carelessness displayed in the matter of communications from an accredited officer of the United States.

Many of these letters are irrelevant to the demands of your especial "protest" of the 25th ultimo, and lengthy communication of the same date, except as to the tone itself and the diplomatic bearing it may have upon Samoan governmental affairs, as well as to judge correctly what may be the rights of Samoans in their own territory wherein a foreigner may be the aggressor.

On the 3d of April Commander Erben, of the United States steamer Tuscarora, under orders from his Government, convened a court in Apia, composed of officers of the said vessel, to adjudicate claims of American citizens against native Samoans. In his letter dated May 11, 1875, addressed to the Hon. S. S. Foster, he says:

"The Department orders that the court submit this to the commanding officer of the United States steamer Tuscarora for approval or disapproval, who will advise the parties concerned of the result of the proceedings and the decisions reached, and you engage upon them to abide by it and consider the question settled, unless the Department of State within one year informs them of the disapproval of the action of the court."

Your letter of March 18, 1875, to the Taimua, transmitting letter from J. M. Coe, making claim for rents of land at Mulintu, clearly comes within the above-quoted express instructions. Again, your letter of May 1, 1875, to the Taimua, informing them of the same claim of J. M. Coe. On the 17th of May another letter to the same effect, both written after the adverse decision of the Tuscarora court to such claim.

The greater number of cases or complaints specified in your several letters previous to the receipt of yours of the 13th ultimo, as well as statements inclosed in letter of the 25th ultimo, were anterior to the formation of the new government, and many of them decided by the Tuscarora court; these I recapitulate with the views of the Government in detail.

1. Names of Samoans fined by Judge Tupua in July, 1873:

Fitia.....	\$10 00
Futia	10 00
	20 00
Seate	10 00
Amosa	10 00
	40 00
The above was money paid to Judge Tupua for three pigs stolen. Also,	
Ulunio.....	4 00
Talo	4 00
	8 00

For cocoa-nuts stolen, and money paid to Judge Tupua.

None of this money has been paid into this office.

S. S. FOSTER,
United States Consul.

MARCH 2, 1875.

This statement is of such a character that I must beg for definite information. The names of the Samoans only appear. You no doubt have the data in your consulate to show what American is entitled to the damages. May I ask why were not these claims presented to the Tuscarora court?

2. At a court held at the United States commercial agency, October 12, 1874, Mr. Williamson against three Samoans for entering his cellar and stealing bottles of brandy.

Present: Laituala, Samoan judge; Tofaeone, Samoan judge; J. M. Coe, United States commercial agent.

Verdict:

Tuvao, guilty, and fined	\$20 00
Sila, accomplice, fined	5 00
Tauese, accomplice, fined	5 00
	30 00

To be paid on the 20th of November, 1874. Part of this fine has been paid to the Samoan judge.

S. S. FOSTER,
United States Consul.

MARCH 2, 1875.

Will you please give the name of the judge who received a portion of this money, and the amount, also if the balance has been paid, and to whom? It should have been presented to the Tuscarora court, but will be settled.

I quote from Commander Erben's approval:

"In the case of William M. Williamson, the court finds that although the evidence may be sufficient to prove the thefts, and also that they were committed by Samoan natives, still, in the opinion of the court, the Samoan government cannot be held responsible for individual thefts in the time of peace, and as the perpetrators of the deed are unknown. In this opinion I fully concur with the court. Mr. Williamson did not report the thefts to the American consul, as he had done in the case of the stealing of the brandy, that he, the consul, might bring it to the notice of the Samoan government, that the thieves might be apprehended. The court find that there are ten (\$10.00) dollars due Mr. Williamson in judgment previously rendered in consular court, that should be allowed. This I have approved."

3. At a court held at the United States commercial agency, July 13, 1874:

Pratt, American, against Latu, Samoan Faliata, for assault.

Present: Salei, Samoan judge; Pourii, Samoan faipule; J. M. Coe, United States commercial agent.

Verdict: Latu has to pay \$15 in this office three weeks from this date, say the 3d day of August, 1874.

This money has never been paid into this office.

S. S. FOSTER,
United States Consul.

MARCH 2, 1875.

I will take immediate steps to learn if any part of this fine has been paid, and notify you of the result, considering it a proper demand. I quote Commander Erben's approval:

"In the case of John Pratt, the court find that fifteen (\$15) dollars, the judgment of a fine before a consular court, has not been paid, and are of the opinion that it should be paid."

This I have approved. But to come within orders of the State Department, which I quote:

"The Department orders that the court submit this to the commanding officer of the United States steamer Tuscarora, for approval or disapproval, who will advise the parties concerned of the result of the proceedings, and the decision reached, and enjoin upon them to abide by it and consider the question settled, unless the Department of State within one (1) year informs them of the disapproval of the action of the court."

A fine of \$25 was paid to Judge Patioli by a Chinaman, for taking the wife away from the son of Morris Scanlan.

This fine was never paid into this office, but kept by the judge.

S. S. FOSTER,
United States Consul.

I quote Commander Erben's approval of finding of the court, and cannot accord the payment into the American consulate:

"In the case of Jeremiah Scanlan, the court found that Mr. Scanlan was unable to prove his American citizenship, and hence did not consider his claim."

It would be gratifying to the government if you would inform it whether or not you have particulars of the finding of a local court in Aana against John Johnson, a colored American, and a heavy fine imposed upon him, for attempted murder upon a woman, injuring her eyes with a charge of shot.

The government informs you that every effort will be made to reach the facts of the case, as well as his recent arrests. Have you records in the consulate to show of his being tried by an American consul, or has there ever been a notification to the consul of his trial by a Samoan court?

I find nothing in the government files relative to the case of John Lee, of Aliapata, anterior to your communication of the 13th ultimo, but have notified the different judges to furnish the government immediate information, that the case may be reached. The case of Alfred Smalley is in like condition, and will receive the same attention, except such as were settled in the Tuscarora court, as per Commander Erben's above-mentioned letter.

"Third. In the case of Albert S. Smalley, the court allow him the claim to the amount of two hundred and seventy-four dollars (\$274.50) and fifty cents." This I have also approved.

I quote from your letter of the 25th ultimo:

"There was a William Williams, American, ordered off of his land, without judgment, or warning, or giving me notice. Again, the wife of Robert Wright, American, was arrested and fined without bringing before me."

The government begs that you furnish the data and place of residence of such parties, that action may be prompt and intelligent.

These recent cases even are anterior to the organization of the local governments in the districts.

His excellency Moessan received his commission as governor of Aana September 16, the judges on the 18th of September.

His excellency Mataapa was appointed governor of Atua September 18, the judges September 22.

His excellency Patioli was appointed governor of Tuamasaga September 23, judges the same day. These are the districts in which the alleged outrages took place.

Upon the receipt of your letter of the 13th ultimo, a special dispatch was forwarded to the Aana authorities not to interfere with foreigners and await the installation of the governor and judges. Since that date his excellency has received instructions to investigate this case and report to the government, that the foreign consuls may be consulted.

The letters of instruction to each governor are explicit with regard to foreign white residents.

As the claims and complaints of the German consul were first brought to the notice of the government and during the sitting of the "Tuscarora" court, they have been first taken up.

The government cannot misapprehend the plain language of your letter of the 25th ultimo: "I am instructed and fully empowered by laws of the United States to have exclusive jurisdiction over American citizens residing on these islands, both in civil and criminal cases, and from which there is no appeal."

This positive ignoring of the government and courts of law places the native Samoan who may have claims against a foreign white resident in an anomalous position for which we can only petition your great government and pray for decisions from their wise administrators, whose understanding of the rights of people, the laws of nations, and the equity and comity of natives in their own territory, as well as the rights of domicile, will make a just solution of such a question.

Reverting again to your letter of the 25th ultimo, with the question:

"Whether it is your intention, when called upon by the American consul, to arrest a criminal that has violated the laws of the United States?"

The government, knowing its obligations to all its people and domiciled residents, answers yes, decidedly.

As the case of assault by Edwards, an American, upon the person of the honorable consul, has been the only one brought to the notice of the present government, the promptitude with which the said Edwards was arrested and confined, gives evidence of the determination of the rulers of Samoa to respect person and property.

In the case of J. P. Woodworth, upon complaint of the honorable consul, the government begs to call his attention to his expressed desire to the judge to have the said Woodworth tried at the same time with Edwards, and not to appear as a witness when Woodworth was not in custody. Your subsequent statement to A. B. Steinberger that you did not care to have the said Woodworth arrested upon complaint of June 4, 1875.

As the honorable consul ignores the jurisdiction of Samoan courts in cases of American citizens, the government begs to be notified of consular trials, and also asks that a representative of the government be in attendance to protect the interests of the Samoans.

The government is pleased to notify the honorable United States consul that governors, judges, magistrates, and others have been appointed in the several districts of the Islands, viz, Tutuila, Atua, Tuamasaga, Aana, Monona and Apalima, Fasaaleaga, Ituo Tani, and Itu Fafinie.

That upon the first day of October the Faipule (house of commons) met and organized, consisting of nineteen (19) members—Tuiatafa elected speaker.

The government begs the consideration of the honorable United States consul, hoping for an appreciation of the fact that outrages will be perpetrated in all communities; for the regulation and protection of society governments are created; that often complaints come from distant parts of the kingdom which require time to adjudicate; and that, as a Christian people, we are entitled to a "community of international law, public and private."

With sentiments of high consideration, I have, &c.,

STEINBERGER,
Premier.

HON. S. S. FOSTER,
United States Consul, Apia.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and seal of the Kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 15.—*S. S. Foster to the Taimua, acknowledging receipt of their dispatch.*

UNITED STATES CONSULATE,
Apia, October 13, 1875.

The dispatch from your excellencies and the honorable premier was handed me yesterday, too late for acknowledgment. Owing to its great length, I shall not be able to give such a document the attention it deserves until my return from Tutuila.

May your excellencies live.

I have, &c.,

S. S. FOSTER,
United States Consul.

To the TAIMUA.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and seal of the Kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 16.—*S. S. Foster to the Samoan government, in reference to J. M. Coe's claims on land at Mulinuu Point.*

UNITED STATES CONSULATE,
Apia, October 16, 1875.

I have the honor to transmit, for your consideration, the certified copy of letter and protest from J. M. Coe, esq., to me in my official capacity.

As the records of the trial before the honorable naval court of inquiry will show what lands were in dispute and the family that defended the suit, it is needless for me at this time to further comment on so plain a case.

I would, however, state that the validity of the title of the land called "Sogi" and the right of Toomalatai, the head of the family of that name, to sell the same, has never been called into question, which is sufficiently proved by portions of the same land (Sogi) sold by Toomalatai and his family to the house of Messrs. Godeffroy & Son, Morris Scanlan, and the Wesleyan mission, all of which are in undisputed possession. Why not seize theirs also? Why should an American citizen be singled out to be despoiled of his land, or is his land more advantageously situated for government purposes?

I would respectfully request your excellencies to weigh well the consequences likely to ensue, and the damage that will have to be paid by thus appropriating the land of an American citizen without compensation.

Be it, therefore, known to the Samoan Government that I, Samuel S. Foster, consul of the United States at Apia for the Friendly Islands and Samoa, being appealed to for the protection of his property by an American citizen, do hereby, in the name of the United States Government, solemnly protest against the Samoan government occupying, or holding or cutting down any trees, or otherwise making any use of, the land called "Sogi," purchased from Toomalatai; and that, further, I hold, in behalf of the American citizen Jonas M. Coe, the Samoan government responsible for the already occupation of the land "Sogi" from the date of the first notification to you, and any further use or occupation of the land "Sogi," as aforesaid.

Done this 16th day of October, 1875.

In witness whereof I have set my hand and affixed the seal of this consulate at Apia, on the day and year first above written, and the Independence of the United States the 99th.

[OFFICIAL SEAL.]

S. S. FOSTER,
United States Consul.

To their excellencies the TAINUA.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the Kingdom of Samoa, this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

Copy of protest made by J. M. Coe to S. S. Foster, United States consul, against the Samoan government for occupying land of his.

SOLAPO MATAUTU,
Apia, October 15, 1875.

SIR: I have the honor to inform you it has come to my knowledge that the Samoan government in Mulinnu has employed Mr. Geo. Pritchard, land surveyor; to survey the land on Mulinnu Point for the purpose of making improvements for the seat of government.

Mr. Pritchard has been engaged for the last two days, if not two days and a half, surveying the point of Mulinnu. In this survey the land known as "Sogi" is included.

I now invite your attention to my letters of the 15th and 22d days of July, 1874, wherein I notified the Samoan government that I had purchased the Sogi land on Mulinnu Point from Toomalatai on the 1st day of June, 1874, and I was prepared then to make an agreement with them to pay me a rent for occupying my land, and if they desired to purchase from me I was prepared to sell; and also in my letter of the 14th day of September, 1874, and the evasive reply made by the Samoan government, which are all recorded in the United States consulate of this port—miscellaneous correspondence book.

And then again I have to invite your attention to my letters through the United States consulate of the 1st and 17th days of May of this year and the unsatisfactory reply made to the same.

I therefore hereby solemnly protest against the unlawful seizure and occupation of my land on Mulinnu, known as "Sogi," by the Samoan government, and I solemnly declare, notwithstanding the assertion made in a communication of the 18th day of May, this year, to the United States consul at this port by the Samoan government, that the land on Mulinnu Point, known as "Sogi," was not brought before the United States naval court of inquiry.

And I hereby solemnly appeal to you, the United States consul at this port, for protection of my rights as a United States citizen.

I have the honor to be, sir, your very obedient servant,

JONAS M. COE.

S. S. FOSTER, Esq.,
United States Consul, Apia.

I hereby certify that the above and foregoing is a true copy of the original now on file in this office. In witness whereof I have hereunto set my hand and seal of this consulate at Apia, this 16th day of October, A. D. 1875.

[SEAL.]

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the copy furnished by S. S. Foster, United States consul. In witness whereof I have hereunto set my hand and seal of the Kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 17.—Col. A. B. Steinberger, premier, to S. S. Foster, United States consul, stating a land commission will be appointed, &c.

GOVERNMENT HOUSE,
Mulinnu, 16th October, 1875.

SIR: Your communication of this date, with inclosure, (certified copy of J. M. Coe's protest,) is received.

I beg to notify you that a joint land commission will, under law, be appointed to adjudicate land claims, disputed titles, and fix boundaries.

I beg to call your attention to the Article I, section 7, of the constitution of Samoa. The consuls of her Britannic Majesty and his Imperial Majesty of Germany address communications to the premier.

I have the honor to be your obedient servant,

STEINBERGER,
Premier.

Hon. S. S. FOSTER,
United States Consul, Apia.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the Kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

C 18.—*The Tamasee to Colonel Steinberger.*

MULINUU, 18th October, 1875.

SIR: This is to explain to your excellency that I am Tamasee, the real owner of the land; there is no other owner of this land, only the Matais family own all the land at Mulinu bounded on one side by land belonging to M. Scanlan, and goes to the extreme end of Mulinu Point.

I also rule and own the sea, commencing at Avaclele, this side of Apia harbor, reaching to Sao harbor opposite Safune and Toamua, running then to Vaitele, on to Vaiusu, as far as Saomatagi.

Sir, I tell your excellency Toomalatai has not the slightest claim on this land—I am the owner.

Also, another thing: for many years and generations the Matais family has owned this land—they have not changed at all; as for Toomalatai, no one knows in what generation or what person has owned this land, as we have only just found out now about them.

May you prosper.

I am,

TAMASEE.

Colonel A. B. STEINBERGER,
Premier.

[Translation.]

C 19.—*Toomalatai to the Taimua, stating that Mr. Coe has no control over a certain piece of land.*

TUAMASAGA GOVERNMENT HOUSE,
Matautu, October 19, 1875.

To the Premier and all the chiefs of the Samoan government:

I am writing about a report that I have heard, viz. that Mr. Coe has written to the government about my land next to Tiafau. It is bounded on the north by the sea-beach, on the east by a piece of land sold by Patioli to the Rev. Geo. Brown, and on the south by the sea.

Do not accept any letters from that gentleman, because this land was never sold to him. The reason we let him have it was only to protect it, on account of a disturbance we had with other chiefs who wanted to claim it; that is the reason I passed it to him, as there was an understanding between the foreign consuls and Samoans to that effect.

When any one wished to get his land protected, questions were not asked if it were legal or not, but would accept the protection. That is why I put my land under the protection of Mr. Coe, the American consul, for fear some one might sell it secretly, or some one of our family might steal it and sell it.

Mr. Coe then gave me forty dollars to bind the contract, but I did not sell it at all. I am still the rightful owner and ruler over this land; no one else has any control over it, and I will not have Mr. Coe writing so about my land.

Now, I write to you, the government, not to accept any more such letters, because I am the owner of such land.

May you be blessed and live.

I am,

TOOMALATAI.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 27th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D 1.—*S. S. Foster, United States consul, to Colonel Steinberger, regarding an assault made on him, and requesting the arrest of H. C. Edwards and J. P. Woodworth.*

MALAFELE, June 3, 1875.

DEAR SIR: I would like for to consult with you immediately in regard to H. C. Edwards, to see if nothing cannot be done to punish him. As I was on my way to consult you in regard to business, he assaulted me in the street, choked me, and used the most abusive language ever one man used to another.

Woodworth was present, and I called on him for protection, but he refused, no doubt being his legal adviser.

I wish the Taimua to have this man arrested and tried, for he swears he will choke me to death if he gets a chance. Mr. Volkmann ran there, or I suppose he would have murdered me outright.

If you wish to see me at your place you must send a guard to protect me.

I have the honor to be, sir, your obedient servant,

S. S. FOSTER,
U. S. Consul.

Col. A. B. STEINBERGER.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto put my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D 2.—Warrant from S. S. Foster, United States consul, for the arrest of H. C. Edwards.

UNITED STATES CONSULATE,
Apia, June 3, 1875.

I hereby authorize any of the Samoan police to enter any American house in Apia, for the purpose of arresting Henry C. Edwards, charged with assault and other offenses.

[OFFICIAL SEAL.]

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D 3.—S. S. Foster, United States consul, to the Taimua, asking their protection from H. C. Edwards and J. P. Woodworth.

UNITED STATES CONSULATE,
Apia, June 3, 1875.

To the Taimua of the Samoan Government:

YOUR EXCELLENCIES: I have the honor to inform you that I was most brutally assaulted by Henry C. Edwards, residing here.

He choked me severely, and threatened to choke me to death, and used the most offensive language; all of which I can prove to your excellencies, and I also believe that I. P. Woodworth was the instigator of it, advising him to choke me.

I wish your aid and protection, and I also wish this man arrested at once and imprisoned until trial, for I am afraid to go into the street to attend to my ordinary business.

May your excellencies live.

I am,

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary of the Taimua.

D 4.—S. S. Foster, U. S. consul, to Colonel Steinberger, respecting H. C. Edwards and J. P. Woodworth.

UNITED STATES CONSULATE,
Apia, June 4, 1875.

SIR: I wish, through your aid and assistance with the Samoan government, to have two American citizens, named Henry C. Edwards and J. P. Woodworth, brought before the court and punished according to the laws of this place, for, without the aid and

assistance of the authorities, consuls are powerless, and consequently life is not safe from lawless desperadoes, so often found on the islands of the Pacific.

I charge Henry C. Edwards with assaulting me in the public streets near my office, in a most brutal manner; choking me severely, and using language against me too indecent to repeat, besides calling me a damned liar, and saying I had perjured myself before the late consular court that condemned him for slander. He also threatened to flog me and choke me to death, which I believe he would have done had not Mr. Ad. Volkmann ran to my assistance.

I also charge J. P. Woodworth with being accessory to the act, with aiding and abetting him, and slandering me and other high officers of the government. I also charge him with standing by and seeing me maltreated and refusing to assist me when called upon, and that he also advised the said Edwards to assault and choke me, using at the same time language against me not fit to repeat.

It is also my true belief that my life is not safe, or the lives of others whom these two persons have a grudge against for some real or fancied injury they may allege done them, so long as they are permitted to remain on the island unconfined.

All of which is respectfully submitted, and which I am able to prove by the following-named witnesses: Mr. Ad. Volkmann, Mr. D. S. Parker, Mrs. S. S. Foster, Fala, (Mrs. Clark,) Mr. W. H. Dunn, Mr. Burmeister, Tasi, (Mrs. Cowley,) Mrs. Charles Cook, Luse and Mele.

S. S. FOSTER.

Sworn and subscribed to before me this 4th day of June, A. D. 1875.

In witness whereof I have hereunto set my hand and affixed the seal of the consulate at Apia this day and year next above written, and of the Independence of the United States the ninety-ninth.

[OFFICIAL SEAL.]

D. S. PARKER,
United States Consul.

Col. A. B. STEINBERGER.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D 5.—*S. S. Foster, United States consul, to the Taimua, for the arrest of J. P. Woodworth.*

UNITED STATES CONSULATE,
Apia, July 6, 1875.

YOUR EXCELLENCIES: I make this request of you, that you cause a warrant to be made out against J. P. Woodworth, American, and give it into the hands of the chief of police, and have him arrested and taken to Mulinuu Point immediately, for the following charges, viz:

Advising H. C. Edwards to make the assault on me, thus making himself accessory to the act.

For refusing to come to my assistance when called upon by me.

May your excellencies live.

I am,

[SEAL]

S. S. FOSTER,
United States Consul.

To the TAIMUA OF THE SAMOAN GOVERNMENT.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 28th day of October, A. D. 1875.

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D 6.—*J. P. Woodworth to Col. A. B. Steinberger, premier of the kingdom, demanding an immediate trial of S. S. Foster, for false charges made by the aforesaid S. S. Foster against him.*

PORT OF APIA, October 15, 1875.

SIR: Mr. S. S. Foster, American consul at Apia, did, on the 6th day of July, A. D. 1875, file in the Samoan court at Mulinuu a sworn complaint, wherein he affirms that J. P. Woodworth, an American citizen residing at Apia, was an accessory to an assault on

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him committed by one H. C. Edwards, and that the said J. P. Woodworth stood by and refused to render assistance when called upon by the aforesaid Foster; and that the said I. P. Woodworth is a dangerous character to be at large; that people's lives are in danger when he has his liberty, and demands of the Samoan government his immediate arrest and confinement; all of which I, J. P. Woodworth, deny, and aver that the aforesaid charges are false, and fabricated through revenge and malice, without a shadow of cause or truth. I especially deny that I was near S. S. Foster during the alleged assault; that I saw no assault nor heard any cry upon me for assistance; and I demand of the Samoan government, through you, an immediate trial on the aforesaid complaint.

I am,

J. P. WOODWORTH.

Witness:

W. WILLIAMSON.

Col. A. B. STEINBERGER,

Premier of Samoa, Mu'nuu Point.

I hereby certify that the foregoing is a true copy of the original. In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary to the Taimua.

COURT PAPERS.

D 7.—Foster vs. Edwards, July 6, 1875.

TO HIS MAJESTY MALEITO'A I,
King of Samoa and the Taimua:

Pursuant to decree of the Taimua at Mulinu, July, 1875, appointing a special mixed commission to try and report on the case of Foster vs. Edwards, and the American, English, and German consuls being requested to appoint each two subjects of their respective countries to act as members of said commission in conjunction with the representatives of the Samoan government, in pursuance thereof the commission, consisting of George F. Waters and I. E. V. Alvord, selected by the American consul; Moses David and James L. Young, selected by the English consul; and G. Levison and H. Y. H. Groht, selected by the German consul; and Tu'atafu, Saga, Tu'ula, Tupuola, Lelevana, and Seale, Samoan representatives, repaired to the government house at Mulinu, Tuesday, July 6, 1875. Maj. J. H. B. Latrobe, jr., (American citizen,) nominated by the Taimua, occupied the chair. Commission called to order. W. F. Williams (English subject) and Moemar (Samoan) appointed clerks and interpreters. The commissioners were then sworn in as jurymen. The judge explained the nature of the complaint, and stated there would be no attorneys for either side—each would be privileged to plead his own cause.

The defendant was called and pleaded "not guilty." Call of witnesses for the prosecution.

A. D. Volkman was called, sworn, and gave his evidence as follows:

I was standing at my counter writing a letter, and happened to look up and saw Edwards (defendant) throttling Mr. Foster, (plaintiff,) and pushing him against the fence, when I got my hat and ran out, when I saw Mr. Foster beckoning to me for assistance. When I reached Mr. Foster, Edwards had let go his neck. That was all I saw. I asked, What is the matter? Then Mr. Edwards told me that if I had the same provocation I would do the same. I said no; because Mr. Foster was an old man. I told Mr. Edwards he had better go up and let the matter alone. Then Mr. Edwards went away.

Mr. Burmeister was called, sworn, and gave his evidence as follows:

Mr. Edwards came to my house and wanted one Woodward to go to Mr. Foster's and get a written agreement; then Mr. Edwards went to Mr. Foster's for the agreement, and then returned and said that Mr. Foster would not give him the paper. Then Mr. Woodward told him to go again for the paper; then Mr. Edwards did not go, but stopped for breakfast. After dinner Mr. Edwards went down, and then I heard that Mr. Foster had been throttled by Edwards. He (Edwards) said that Mr. Foster struck him first with an umbrella. Mr. Edwards came back with no paper. Mr. Woodward then told him to go again and get the paper. That is all.

E. Cook was called, sworn, and declared as follows:

I saw nothing myself, but heard a noise, and then ran out and saw Edwards throttling Mr. Foster. That is all.

Mrs. Foster was called, sworn, and declared as follows:

I was up at my house, and one of my boys came and told me Mr. Foster wanted me to translate a letter. I started to go and saw Mr. Foster behind me; then we walked together. When we got to the road Mr. Edwards stood before us, and Mr. Woodward about the distance of the road from the government house; then I saw they were after some design. Then Mr. Foster asked Mr. Edwards if he wanted to see him, and he said "Yea." Then Mr. Foster said if it were about the paper to go to Mr. Parker, he (Foster) had nothing to do with it. We both went into the office together, when Mr. Foster came out and left me alone; then I looked out and saw Mr. Foster, Mr. Edwards, and Mr. Woodward talking together; Mr. Foster was leaning against the fence; then I looked again and saw Mr. Edwards choking Mr. Foster, and then I ran out; then I said to him (Edwards) three times let Mr. Foster go. Then Mr. Foster asked him (Edwards) if he wanted to strike an old man like him. Edwards said, "No; not to strike you, but choke you;" and then swore, and then said, "You son of a bitch, your power is no more than that of a cat." Then Mr. Volkman came, and Mr. Foster called on him for assistance. All this time Mr. Woodward was standing close by and did not offer to help. That is all.

Mary Orlof was called, sworn, and testified as follows:

I went down when the quarrel was all done. I did not witness the assault on Mr. Foster; I heard of it; that is all.

Fala called, sworn, and testified as follows:

I heard Mrs. Foster call me to go and help Mr. Foster, but did not know what it was about; then I went down and saw Mr. Foster and Mr. Edwards standing at the gate, and Mr. Edwards had hold of Mr. Foster's beard; he pulled his beard, and at the same time was beating his legs with a walking-cane; then Mr. Foster asked him (Edwards) if he wished to beat an old man. Then Edwards said, "I will not hit you, but choke and beat you till your intestines come out; you are a thief, and a liar, and an old son of a bitch." That is all I heard and saw.

Question by jury. Do you understand English?—Answer. Yes, sir; even when spoken rapidly in anger.

W. Dunn was called, sworn, and testified as follows: I was not a witness to the assault, but arrived about ten minutes afterward.

Question. Did you have any conversation with Edwards on the subject?—Answer. No, sir; Mr. Foster showed me his neck, on which were large red lumps, the same as if some one had choked him.

Mr. Parker was called, sworn, and testified: I did not witness the assault.

Mr. Foster was called, sworn, and testified as follows: I swear to the correctness of my evidence as given in the preliminary examination of Mr. Edwards.

This closed the evidence for the plaintiff.

Evidence for the defense.

H. C. EDWARDS was called, sworn, and testified as follows:

On the morning of the day of the assault I went to Mr. Foster to get a paper to the effect of an accusation made the day before at an investigation. Mr. Foster refused. I met him in the afternoon, and then he struck me with his umbrella. Then I choked him a little. As to a cane or walking-stick, I had nothing of the kind. That is all.

Mr. FOSTER recalled.

Question. Did you strike Edwards with an umbrella?

Answer. I swear I did not strike him with an umbrella.

This closed the case. The judge then proceeded to sum up the evidence, and addressed the jury as follows:

Gentlemen of the jury: This is a case which is happily of rare occurrence in our peaceable isles. A man, an old man, an officer high in rank of the American Government, has been assailed in the streets of Apia, in broad daylight. I shall not dwell on the circumstances. You have heard the evidence, contradictory in many instances. 'Tis for you to decide on the credibility to be given to the different statements you have heard, and the responsibility of passing verdict rests with yourselves. I particularly have dispensed with advocates, that your judgment might be based on the bare and naked facts, and that you might not be governed in your views, as men often are, by the sophistry of counsel. I would suggest, gentlemen, in rendering your verdict, some weight be given to the term of confinement the said Edwards has already endured. With these remarks, gentlemen, I leave the case in your hands, confident that you will deal justly and impartially with these parties, and inflict on the defendant such damages, and no more, as you may think under all the circumstances of the case he is fairly entitled to receive.

The jury then retired, returning after an hour's deliberation, bringing in the accompanying verdict:

By order of the judge, the defendant was discharged from custody.

To the Honorable Judge :

We, the jury in the case of *Foster vs. Edwards*, find the said Edwards guilty of the assault as charged.

In view of our belief in there having been some provocation to the assault, we recommend that the said Edwards be released from custody as having suffered punishment to the full extent of the crime.

In this we agree unanimously.

TUIATAFU.

SAGA.

TUULA.

TUPUOLA.

LELEVANA, his + mark.

SEALE, his + mark.

GEO. F. WATERS, *Foreman*.

J. E. V. ALVORD.

JAMES L. YOUNG.

MOSES DAVID.

H. Y. H. GROHT.

G. LEVISON.

M. K. LEMAMEA,

Clerk of Court and Interpreter.

THOMAS WILLIAM WILLIAMS,

Secretary and Interpreter.

I hereby certify the foregoing to be a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

THOMAS WILLIAM WILLIAMS,

Secretary to the Taimua.

E 1.—*S. S. Foster, United States consul, to the Taimua, informing them of his appointing E. L. Hamilton as vice-consul.*

UNITED STATES CONSULATE,

Apia, January 9, 1875.

To the Chiefs and Rulers of Samoa :

I have the honor to inform you that, having to go to Tutuila for a few days, I have appointed Mr. E. L. Hamilton as vice-consul, to act during my absence, and that all official communications you may have with this office should be addressed to him until my return, of which you shall have due notification.

I have the honor to remain, your obedient servant,

S. S. FOSTER,

United States Consul.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary to the Taimua.

E 2.—*Copy of report made by D. S. Parker to S. S. Foster, United States consul.*

MATAFELE, March 2, 1875.

S. S. FOSTER, Esq.:

SIR: I proceeded to the residence of Mr. William Allen, as you requested me, and I made a strict search for property belonging to the late Judge Final, and all that was to be found there is the two old coats I send you by the bearer.

I am, sir, your obedient servant,

D. S. PARKER.

I hereby certify that the foregoing is a true copy of the copy furnished by S. S. Foster, United States consul.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,

Secretary to the Taimua.

S. S. Foster, United States consul, to the Taimua, stating various grievances.

UNITED STATES CONSULATE,
Apia, March 3, 1875.

I must inform your excellencies that on my return yesterday I appointed Mr. D. S. Parker to act as an officer of the United States, and proceed to the house of William Allen, American, and search for things belonging to the late Judge Finai.

After strict search of the whole house, all that was found was two old coats, which are now sent to you.

If he has any money, he must have deposited it somewhere else.

I must also inform your excellencies that, according to the inclosed account sent by Mr. Coe, there was paid to Judge Tupua \$48, which has not been paid into this office, as it should have been.

I also inclose you another account, a part of which has been paid to the Samoan judge, but whether it was paid to Finai I cannot tell at present.

I would also call your excellencies' attention to another fine of \$25 that was paid by the Chinaman to Patiole for M. Scanlan. This money was also kept by the judge; and there are other cases which I will inform your excellencies when you have adopted your new constitution and good laws to govern your people. I have not spoken to your excellencies of these matters before, because I knew you was about to make a new government, and I was waiting patiently for you to settle your little disputes among yourselves. And I hope now your excellencies will not delay any longer, but get your government in working order, and appoint good and honest men for your judges; for what is the use of your collecting taxes and fines if you allow officers to steal the money and use it for themselves and families, instead of paying the government debts, and then let them go unpunished?

May you live long and prosper in your government.

I am,

S. S. FOSTER,
United States Consul.

To the LORDS TAIMUA,
And all their Excellencies of the Government of Samoa.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom, this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

E3.—*Copy of commission to D. S. Parker from S. S. Foster, United States consul, appointing him vice-consul.*

UNITED STATES CONSULATE,
Apia, March 2, 1875.

SIR: I hereby appoint you as vice-consul of the United States, and to act as marshal for the same, to proceed to Matautu and receive from William Allen all the property in his house, or that of Alfred Smalley, belonging to the late Judge Finai, a government defaulter, and that in this is not given up *peacable*, you are empowered to call for assistance to the Samoan authorities and search the house to obtain the property of the said Judge Finai.

Done this first day of March, A. D. 1875. Witness my hand and seal.

[OFFICIAL SEAL.]

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Simoa, this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

D. S. PARKER, Esq.

E. 4.—*S. S. Foster to the Taimua, informing them of his appointing J. M. Coe as vice-consul.*

UNITED STATES CONSULATE,
Apia, October 11, 1875.

YOUR EXCELLENCIES: I beg leave to inform you that I have appointed J. M. Coe, esq., as United States vice-consul during my absence from Apia, and that the office will be held at Matautu until my return.

May your excellencies live.

I am, &c.,

S. S. FOSTER,
United States Consul.

To the TAIMUA.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 1.—*Letter of Hon. S. S. Foster to Capt. George Hamilton, relating to Peerless.*

UNITED STATES CONSULATE,
Apia, September 20, 1875.

SIR: By a dispatch received by me from the Department of State, per mail of the Mikado, September 4, I am under the necessity of examining into the ownership and other matters connected with the schooner *Peerless*, now carrying the American flag, as I have understood she is owned by an American, a foreign resident.

I would call your attention to this clause of the dispatch for my instructions:

"You are instructed to report particularly what vessels of any description of this class are known within your consular district, the names, tonnage, and particulars which may be ascertained in relation thereto."

Again, the instructions of the dispatch say: "And whether such vessels, or others, carrying the flag of the United States under these circumstances, are subject to any burdens, or enjoy any immunities or exemptions, as compared with regularly documented American vessels in regard to consular dues and charges, or otherwise."

Again, by this dispatch, I quote the following, viz: "In this connection it is desired that full information may be given as to the shipment and discharge of seamen on such vessel, the form of articles used, the usual term of engagement, the character and nationality of the officers and crews, and the practice as to relief and the collection of extra wages."

"In specifying the above particulars it is not intended to limit your report to them alone; but it is the object of the Department to obtain the best and most accurate information upon the whole subject, and the reason of the existence of this class of vessels. You will include in the report whatever may, in your opinion, contribute to this end."

I have given such extracts from the late dispatch as bears on the case of the schooner *Peerless*, not that I was obliged to thus show my power; but I done so as some one like Commander Erben, that knows nothing about the rules and regulations of our mercantile marine, as prescribed by the Department, may tell you, as he did in regard to the extra pay of Jenkins and Brehuus, that I was acting arbitrary, illegal, tyrannical, and unjust.

I wish you, therefore, to report to me at once who is the reputed owner of the schooner *Peerless*, and if he is an American residing abroad, by whom and how the transfer was made.

Since May 14, a period of over four months, you have neither shipped or discharged any seamen or paid any consular dues, although you have kept a full crew; and in consequence you come under that part wherein you have "no burdens to bear, neither shipped or discharged any seamen, or paid consular dues," and that "enjoys favors and immunities that regular documented vessels in the United States does not possess."

You will therefore report the number of men you have shipped and discharged since your arrival at the port of Apia, with the amount of wages paid to each, and whether you have deducted the usual hospital fees enjoined on shipmasters to collect.

Whether you have paid in full the seamen discharged, and in what manner, and whether there is any money still due such seamen.

After your report to me, and cash settlement of all dues and arrears of wages (if any) of seamen discharged, you will be entitled to your register when you leave for another consular district, but not till then, and, as a shipmaster of long standing, you know the penalty—her register will be sent to the Department and canceled, and the

vessel liable to seizure and condemnation, and you yourself are personally liable to fine or imprisonment by order of any court in the United States, in any port you may happen to go to.

I am, your obedient servant,

S. S. FOSTER,
United States Consul.

Capt. G. HAMILTON,
Schooner Peerless, Apia Harbor.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa, this 28th day of October, 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 2.—*Letter from Col. A. B. Steinberger to Hon. S. S. Foster, relative to yacht Peerless.*

MULINUU, 21st September, 1875.

Hon. S. S. FOSTER,
United States Consul:

SIR: All information you require as to schooner Peerless will be given you.

Register No. 59, port of San Francisco, and shipping-papers you have.

The Peerless is not a trading-vessel, 45 tons burden: a yacht, and with no immunities other than belong to vessels or a yacht in the United States.

No discharged seamen have arrears of wages, and if consular-fees are due the captain will pay the same.

I know of no one having acted the part of seaman on said craft not on the papers, except one Parker, whom you put on board for a trip to Tonga without shipping, (yourself and family being passengers,) a procedure which I condemned at the time, of which I made careful memoranda.

I have instructed Captain Hamilton to have a copy of his receipts made and attested by the United States consul, also all ship's papers, for my benefit.

I have the honor to be your obedient servant,

A. B. STEINBERGER.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 23th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 3.—*Answer by Hon. S. S. Foster to Col. A. B. Steinberger, relative to Peerless.*

UNITED STATES CONSULATE,
Apia, September 22, 1875.

SIR: I addressed a letter to Capt. George Hamilton, of the schooner Peerless, asking him certain questions, pursuant to my instructions, in regard that vessel and crew, which I expect him to answer.

As you are not known on the register, or your name mentioned in the shipping-articles, I do not see why you should address me on the subject.

I have the honor to be, sir, your obedient servant,

S. S. FOSTER,
United States Consul.

Col. A. B. STEINBERGER,
Premier of the Samoan Government.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 4.—*Letter of Hon. S. S. Foster to Capt. George Hamilton, relating to Peerless.*

UNITED STATES CONSULATE,
Apia, September 24, 1875.

SIR: Thereby give you notice that I hold the schooner Peerless, with master and owners, responsible for the fine of \$100 and \$10 costs of court imposed upon Charley Teui, a Chinaman, cook of the schooner Peerless, tried on Tuesday, September 21, in this con-

sulate, on a complaint made by you, September 18, for assault committed on W. Parker, on board of the schooner Peerless.

Also, the arrears of wages you informed me due the Rotmah, native "Med," when he deserted, although the man made application to me at the time for his wages.

I would also remind you that I have not received an answer to my communication to you on September 21, making certain inquiries in regard to the schooner Peerless carrying the American flag in foreign waters.

As this is an order from the Department of State, I wish an answer immediately.

Given under my hand and seal of this consulate, at Apia, the day and year first above written.

[SEAL.]

S. S. FOSTER,
United States Consul.

Capt. GEORGE HAMILTON,
Schooner Peerless, Apia Harbor.

I hereby certify the foregoing to be a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 5.—Answer by Capt. George Hamilton to S. S. Foster, relating to Peerless.

YACHT PEERLESS,
Apia Harbor, September 28, 1875.

SIR: I beg to acknowledge the receipt of your favor of September 20, and shall endeavor to answer, categorically, your interrogatories as therein contained.

1. I quote from your quotations, as quoted in letter to me: "You are instructed to report particularly what vessels, of any description, of this class are known within your consular district, the names, tonnage, and particulars in regard to each, the names of the reputed owners, date of transfer, to whom transferred, and in what manner, with any other particulars which may be ascertained in relation thereto."

The name of yacht is Peerless, was built in San Francisco, has two masts, and that her length is 77 feet 5 $\frac{1}{2}$; breadth, 17 feet; depth, 5 $\frac{1}{2}$ feet; tonnage, 45 $\frac{1}{2}$.

Capacity under tonnage-deck.....	33.18
Between decks above tonnage-deck.....	12.64
	45.82

I, George Hamilton, am master, (see register,) report and am responsible to Col. A. B. Steinberger, agent for J. B. Ford, of San Francisco, in Samoa. For further particulars, I beg to refer you to the register and other papers as filed in your office.

2. "And whether such vessels, or others carrying the flag of the United States, under these circumstances, are subject to any burdens or enjoy any immunities or exemptions as compared with regularly documented American vessels in regard to consular dues and charges or otherwise."

The Peerless carries the flag of the United States, as entitled by register; is not a trader, and is not subject to immunities, exemptions from consular or other fees.

3. "In this connection it is desired that full information may be given as to the shipment and discharge of seamen on such vessels, the form of articles used, the usual term of engagement, the character and nationality of the officers and crews, and the practice as to relief and the collection of extra wages."

In answer to the above, I again beg to refer you to the articles and papers as filed in your office.

4. "In specifying the above particulars it is not intended to limit your report to them alone, but it is the object of the Department to obtain the best and most accurate information upon the whole subject, and the reason for the existence of this class of vessels. You will include in your report whatever may, in your opinion, contribute to this end."

This question I must plead my inability to answer. I am employed by Colonel Steinberger, agent as aforesaid, to sail and look after the Peerless, and am paid for so doing, but whether it was caprice, pleasure, or what-not, that dictated the purchase of the same, I am not advised.

Attached please find statement of men shipped and discharged, wages paid, hospital and other dues.

Such further information as lies in my power to give I shall be most happy to communicate.

I confess to feeling both aggrieved and annoyed that the American consul should

have thought necessary to use such expressions as fine, imprisonment, and personal liability, as I find in the closing sentence of your letter to me.

For twenty years I have commanded vessels in the South Seas. It has been my invariable custom to comply with such laws and regulations as belonged to the ports I have visited, and for the first time have had the legality of my papers and integrity of my actions questioned.

I have the honor to be your most obedient servant,

GEORGE HAMILTON,
Master Yacht Peerless.

Hon. S. S. FOSTER,
United States Consul, Apia.

I hereby certify the foregoing to be a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 6.—*Receipt of Hon. S. S. Foster, American consul, in account with yacht Peerless.*

Yacht Peerless in account with United States consulate.

Extra wages, Jenkins and Brehuus.....	\$95 00
Letter to arrest seaman.....	2 00
Discharge of two seamen.....	2 00
Shipment and discharge of Bird.....	2 00
Hospital dues:	
Jenkins, 2 months and 15 days.....	1 00
Brehuus, 2 months and 15 days.....	1 00
Med, 3 months and 12 days.....	1 35
Joe.....	25
Andrew, 4 months.....	1 60
Balance of wages due Med, (deserter).....	17 10
	123 30
Less passage to Tonga and return, (S. S. Foster and daughters).....	100 00
Balance.....	23 30

APIA, SAMOA, *September 23, 1875.*

Received payment.

S. S. FOSTER,
United States Consul.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 7.—*Letter of Hon. S. S. Foster to Capt. George Hamilton, relative to yacht Peerless.*

UNITED STATES CONSULATE,
Apia, September 29, 1875.

SIR: Your report in answer to my request of September 20, in regard to ownership and other matters connected with the schooner *Peerless*, has been received, and, with all accompanying documents, will be forwarded to the United States for inspection by the Department of State.

At the close of your report you remark that you feel aggrieved and annoyed because I refer you to certain pains and penalties for not complying with the law. I would inform you that in many places of our book of instructions we are strongly reminded that we are to be heavily fined and imprisoned for not only violating the laws but for not seeing them properly executed, and that we are made personally liable for non-collection of all fees, dues, fines, wages, &c., due the United States and prescribed by their laws; and they never ask us if we feel aggrieved at these heavy fines and penalties.

The consul is responsible to his Government for any wrong he may commit in the discharge of his official duties, and to his Government alone, and for which he gives bonds before entering on the duties of his office for his faithful performance.

In conclusion of your report you say you have been so long a shipmaster, and always obeyed the laws and customs of the port. I sincerely believe you, for from my personal acquaintance with you, now of some years' standing, and knowing your antecedents for almost the whole time you mention, and further, that you have honorably discharged your duties as a shipmaster and been beloved and respected by the numerous passengers you have carried to and fro in your long intercourse with the colonies, and that it is also my belief that, had you been master and owner and agent of the schooner *Peerless*, since her arrival in Samoan waters, there would never have been any trouble between you and the American consul, or that he would have been obliged to have written to you on any subject whatever.

In thus concluding this correspondence, I again remind you that in case of Chinese cook I refer you as my ultimatum to my official communication to you on September 24.

I have the honor to be, sir, your obedient servant,

S. S. FOSTER,
United States Consul.

Capt. GEORGE HAMILTON,
Schooner Peerless, Apia Harbor.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and the seal of the Kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 8.—*Answer by Capt. George Hamilton to Hon. S. S. Foster, relating to Peerless.*

MULINUU, September 30, 1875.

SIR: I have your favor of the 29th, and am grateful for your kindly expressions as to myself as contained therein.

Regarding the *Peerless*, I have control of the craft, as master, and have been governed solely by my own judgment in the management of the same.

Your flattering allusions to myself seem to be an imputation of wrong upon innocent parties who cannot interfere with my position as master.

Again thanking you for your personal expressions of regard,

I have the honor to be, your obedient servant,

GEORGE HAMILTON,
Master Yacht Peerless.

Hon. S. S. FOSTER,
United States Consul, Apia.

I hereby certify that the foregoing is a true copy of the original.

In witness whereof I have hereunto set my hand and seal of the Kingdom of Samoa this 28th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

F 9.—*Letter of Capt. George Hamilton to Col. A. B. Steinberger.*

YACHT *PEERLESS*,
Apia Harbor, October 16, 1875.

SIR: For months past I have been subjected to a series of interferences at the hands of the American consul, S. S. Foster. Heretofore I have refrained, as far as possible, from troubling you, knowing how occupied your time has been. I now beg leave to lay before you the correspondence, such as has passed from time to time between the American consul and myself, portions of which you are no doubt familiar with. My list of grievances began almost from the date of my arrival in Samoan waters. I refer to the case of Jenkins and Brehms, deserters and insubordinates generally. Through the kind intervention of Captain Erben, this case was compromised for \$90, the consul claiming \$205.

This is but one of the many, in fact almost weekly, annoyances and indignities to which I am subjected. I now write to ask your protection against this interference on the part of the American consul with me in the discharge of my duties.

For many years I have commanded vessels in the South Seas. The course of my business has brought me in contact with consuls and officers of many nationalities, with whom my relations have always been pleasant, and to whom my business transactions have invariably given satisfaction, Mr. Foster alone excepted.

I take the liberty to inclose copies of letters from firms in Sydney, in whose employ I have been, and with whom I have had business relations.

Your obedient servant,

GEORGE HAMILTON.
Master Yacht Peerless.

Col. A. B. STEINBERGER.

I hereby certify that the foregoing letter and inclosed certificates are true copies of the originals.

In witness whereof I have hereunto set my hand and the seal of the Kingdom of Samoa this 30th day of October, A. D. 1875.

[SEAL.]

THOMAS WILLIAM WILLIAMS,
Secretary to the Taimua.

SYDNEY, *September 9, 1872.*

Having known Captain Hamilton, of the brig Scotsman, for the last ten or eleven years, and found him a careful, trustworthy shipmaster, we have much pleasure in giving a favorable testimony as to his character and sobriety.

A. H. C. MACAFEE.

SYDNEY, *September 9, 1872.*

We have known Capt. George Hamilton for the past ten years, and have every confidence in him as a captain and thorough seaman. He has been in our employment for years past, and has given us the utmost satisfaction.

T. & I. SPINNER.

YORK STREET, SYDNEY, *August 31, 1872.*

The bearer, Captain Hamilton, has been known to me for some years as the commander of vessels trading to the South Sea Islands. He was for a short time in my employment as master, and I can speak with confidence of him as thoroughly trustworthy and energetic, as I believe can every one by whom he has been employed.

MOORE, HENDERSEN & BOUCHER.

This is to certify that we have known Capt. George Hamilton over fifteen years, while in command of the Scotsman and other vessels in the island trade, and have always found him an able master, and careful in the conduct of his vessels.

GEORGE A. LLOYD, JR.

SYDNEY, 6, 9, 1872.

SYDNEY, *May 10, 1872.*

Captain Hamilton has been in our employ, in command of the brig Scotsman, for the past five years, and during that period we have found him a very trustworthy and efficient officer.

We have much pleasure in giving this recommendation, and shall be glad to hear of his obtaining a good command, for which he is well qualified.

He leaves our service in consequence of the sale of the Scotsman.

T. & I. SPINNER.

APIA HARBOR, *June 20, 1859.*

This is to certify that George Hamilton, now master of brig Caroline Hort, has been in our employ for two years, and has given us entire satisfaction in this South Sea Island trade.

HORT BROTHERS.

APIA, SAMOA.

No. 25.

*Mr. Steinberger to Mr. Fish.*MULINUU, UPOLU, SAMOA,
October 29, 1875. (Received Dec. 6.)

SIR: I beg to offer my resignation as an agent of the United States Government, reserving the tender of my resignation until such time as I could report under instructions and consider my duties ended.

Believing that I may ever retain the confidence of my country, I have the honor to be,

Your obedient servant,

A. B. STEINBERGER.

Hon. HAMILTON FISH,
Secretary of State, Washington, D. C.

No. 26.

Mr. Foster to Mr. Hunter.

No. 30.]

UNITED STATES CONSULATE,
Apia, October 3, 1875. (Received Dec. 31.)

SIR: I have the honor to inform you that I have been requested by the most worthy Lord Bishop Louis Elloy, of the Catholic diocese for Samoa, and also by the Revs. G. A. Turner, jr., and S. I. Whitmer, secretary and treasurer, and Revs. G. A. Turner, sr., and George Pratt, all of the board of missions for the London Missionary Society, to inquire of the Department of State the present status of Col. A. B. Steinberger in regard to the Government of the United States, and its future protection of Samoa; and whether he was authorized to form a government here; and whether it is their intention to sustain him by the power of the United States Government. A full board of the London Missionary Society is ordered to be convened in November next, to take into consideration what steps ought to be taken to prevent the utter demoralization of the natives now going on since May last.

If the bishop and members of the board of missions are assured Colonel Steinberger is not acting under authority of the United States Government, or that the United States Government will not retain him in power by force, he will be sent off the island by their influence with the high chiefs. In consideration of the high character of these worthy men, and their desire not to mix themselves with political affairs of the country, and also their desire to still try and improve this people, that they regard still in their infancy, I have made this request for them, and respectfully beg an answer at your earliest convenience.

I am, &c.,

S. S. FOSTER.

No. 27.

Mr. Campbell to Mr. Foster.

No. 18.]

DEPARTMENT OF STATE,
Washington, January 12, 1876.

SIR: I have to acknowledge the receipt of your dispatch No. 30, of the 3d of October last. It relates to the status of Col. A. B. Steinberger

in Samoa, and the request of certain missionaries to be informed whether Colonel Steinberger is authorized by the United States to form a government in Samoa, and whether he will be retained in power in the islands by force.

In reply, I have to inform you that Colonel Steinberger first went to the Samoan Islands in 1873, in the capacity of special agent of the United States Government, to make observations and report upon the character and condition of the islands and their inhabitants. After some months spent on the islands, he returned to this country and made his report. In December, 1874, he was directed to proceed to the islands again, in the capacity of special agent, for the purpose of presenting a letter from the President, and a number of presents from this Government to the Taimua of Samoa. He has fulfilled his mission, made his report, and tendered his resignation as special agent, which has been accepted, and any official or semi-official connection he may have had with this Government is terminated. His first visit to the islands was merely for the purpose of observing and reporting upon their condition; his second visit was to fulfill certain duties in regard to which he was specially instructed, and which have been fulfilled. On neither occasion did his visit have any diplomatic or political significance whatever. Colonel Steinberger was not authorized or empowered by the United States to form a government in Samoa, or to pledge the United States to sustain, in any way, directly or indirectly, any government that he might form or assist in forming.

The United States consul is the only representative of the United States in the Samoan Islands, and you will so inform the missionaries and others interested.

I am, &c.,

J. A. CAMPBELL,
Third Assistant Secretary.

EXERCISE OF EXECUTIVE FUNCTIONS AT WASHINGTON
CITY AND ELSEWHERE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RESPONSE TO

A resolution of the House of Representatives, passed on the 3d day of April, requesting the President of the United States to inform the House of Representatives whether any executive offices, acts, or duties, and, if any, what, have within a specified period been performed at a distance from the seat of Government established by law, &c.

MAY 4, 1876.—Referred to the Committee on the Judiciary and ordered to be printed.

To the House of Representatives :

I have given very attentive consideration to a resolution of the House of Representatives, passed on the 3d day of April, requesting the President of the United States to inform the House whether any executive offices, acts, or duties, and, if any, what, have within a specified period been performed at a distance from the seat of Government established by law, &c.

I have never hesitated, and shall not hesitate, to communicate to Congress, and to either branch thereof, all the information which the Constitution makes it the duty of the President to give; or which my judgment may suggest to me, or a request from either House may indicate to me will be useful in the discharge of the appropriate duties confided to them. I fail, however, to find in the Constitution of the United States the authority given to the House of Representatives (one branch of the Congress in which is vested the legislative power of the Government) to require of the Executive—an independent branch of the Government, co-ordinate with the Senate and House of Representatives—an account of his discharge of his appropriate and purely executive offices, acts, and duties, either as to when, where, or how performed.

What the House of Representatives may require as a right in its demand upon the Executive for information, is limited to what is necessary for the proper discharge of its powers of legislation or of impeachment.

The inquiry in the resolution of the House as to where executive acts have, within the last seven years, been performed, and at what distance from any particular spot, or for how long a period at any one

time, &c., does not necessarily belong to the province of legislation. It does not profess to be asked for that object.

If this information be sought, through an inquiry of the President as to his executive acts, in view or in aid of the power of impeachment vested in the House, it is asked in derogation of an inherent natural right, recognized in this country by a constitutional guarantee which protects every citizen, the President as well as the humblest in the land, from being made a witness against himself.

During the time that I have had the honor to occupy the position of President of this Government, it has been, and while I continue to occupy that position it will continue to be, my earnest endeavor to recognize and to respect the several trusts and duties and powers of the co-ordinate branches of the Government, not encroaching upon them nor allowing encroachments upon the proper powers of the office which the people of the United States have confided to me, but aiming to preserve in their proper relations the several powers and functions of each of the co-ordinate branches of the Government, agreeably to the Constitution, and in accordance with the solemn oath which I have taken to "preserve, protect, and defend" that instrument.

In maintenance of the rights secured by the Constitution to the executive branch of the Government, I am compelled to decline any specific or detailed answer to the request of the House for information as to "any executive offices, acts, or duties, and, if any, what, have been performed at a distance from the seat of Government established by law, and for how long a period at any one time, and in what part of the United States."

If, however, the House of Representatives desires to know whether, during the period of upward of seven years during which I have held the office of President of the United States, I have been absent from the seat of Government, and whether during that period I have performed or have neglected to perform the duties of my office, I freely inform the House that from the time of my entrance upon my office I have been in the habit, as were all of my predecessors, (with the exception of one who lived only one month after assuming the duties of his office, and one whose continued presence in Washington was necessary from the existence at the time of a powerful rebellion,) of absenting myself, at times, from the seat of Government, and that during such absences I did not neglect or forego the obligations or the duties of my office, but continued to discharge all of the executive offices, acts, and duties which were required of me as the President of the United States. I am not aware that a failure occurred in any one instance of my exercising the functions and powers of my office in every case requiring their discharge, or of my exercising all necessary executive acts in whatever part of the United States I may at the time have been. Fortunately, the rapidity of travel and of mail-communication, and the facility of almost instantaneous correspondence with the offices at the seat of Government which the telegraph affords to the President, in whatever section of the Union he may be, enable him, in these days, to maintain as constant, and almost as quick, intercourse with the Departments at Washington as may be maintained while he remains in the capital.

The necessity of the performance of executive acts by the President of the United States exists, and is devolved upon him, wherever he may be within the United States during his term of office, by the Constitution of the United States.

His civil powers are no more limited, or capable of limitation, as to the place where they shall be exercised, than are those which he might be required to discharge in his capacity of Commander-in-Chief of the

Army and Navy ; which latter powers, it is evident, he might be called upon to exercise, possibly even without the limits of the United States. Had the efforts of those recently in rebellion against the Government been successful in driving a late President of the United States from Washington, it is manifest that he must have discharged his functions, both civil and military, elsewhere than in the place named by law as the seat of Government.

No act of Congress can limit, suspend, or confine this constitutional duty. I am not aware of the existence of any act of Congress which assumes thus to limit or restrict the exercise of the functions of the Executive. Were there such acts, I should nevertheless recognize the superior authority of the Constitution, and should exercise the powers required thereby of the President.

The act to which reference is made in the resolution of the House relates to the establishment of the seat of Government and the providing of suitable buildings, and removal thereto of the offices attached to the Government, &c. It was not understood at its date and by General Washington to confine the President in the discharge of his duties and powers to actual presence at the seat of Government. On the 30th of March, 1791, shortly after the passage of the act referred to, General Washington issued an executive proclamation, having reference to the subject of this very act, from Georgetown, a place remote from Philadelphia, which then was the seat of Government, where the act referred to directed that "all offices attached to the seat of Government" should for the time remain.

That none of his successors have entertained the idea that their executive offices could be performed only at the seat of Government is evidenced by the hundreds upon hundreds of such acts performed by my predecessors in unbroken line from Washington to Lincoln, a memorandum of the general nature and character of some of which acts is submitted herewith ; and no question has ever been raised as to the validity of these acts, or as to the right and propriety of the Executive to exercise the powers of his office in any part of the United States.

U. S. GRANT.

WASHINGTON, *May 4, 1876.*

Memorandum of absences of the Presidents of the United States from the national capital during each of the several administrations, and of public and executive acts performed during the time of such absences.

PRESIDENT WASHINGTON

was frequently absent from the capital ; he appears to have been thus absent at least one hundred and eighty-one days during his term.

During his several absences he discharged official and executive duties. Among them—

In March, 1791, he issued a proclamation, dated at Georgetown, in reference to running the boundary for the territory of the permanent seat of the Government.

From Mount Vernon he signed an official letter to the Emperor of Morocco, and from the same place the commission of Oliver Wolcott, as Comptroller of the Treasury, and the proclamation respecting the whisky insurrection in Pennsylvania ; also various sea-letters ; the proclamation of the treaty of 1795 between the United States and Spain, the Execu-

tive order of August 4, 1792, relative to the duties on distilled spirits, &c.

When at Germantown, he signed the commission of John Brackenridge as attorney of the United States for Kentucky, and that of engineer of the United States Mint.

He proposed to have Mr. Yrujo officially presented, as envoy extraordinary and minister plenipotentiary from Spain, to him at Mount Vernon, but although Mr. Yrujo went there for the purpose, the ceremony of presentation was prevented by Mr. Yrujo's having accidentally left his credentials.

PRESIDENT JOHN ADAMS.

President John Adams was absent from the capital during his term of four years, on various occasions, three hundred and eighty-five days.

He discharged official duties and performed the most solemn public acts at Quincy, in the same manner as when at the seat of Government.

In 1797 (August 25) he forwarded to the Secretary of State a number of passports which he had signed at Quincy.

He issued at Quincy commissions to numerous officers of various grades, civil and military.

On the 28th September, 1797, he forwarded to the Secretary of State a commission for a justice of the Supreme Court, signed in blank at Quincy, instructing the Secretary to fill it with the name of John Marshall, if he would accept, and, if not, Bushrod Washington. He issued a proclamation opening trade with certain ports of St. Domingo and signed warrants for the execution of two soldiers and for a pardon.

PRESIDENT JEFFERSON

was absent from the seat of Government during his two terms of office seven hundred and ninety-six days, more than one-fourth of the whole official period.

During his absence he signed and issued from Monticello seventy-five commissions, one letter to the Emperor of Russia, and nine letters of credence to diplomatic agents of the United States accredited to other governments.

PRESIDENT MADISON

was absent from the seat of Government during his two presidential terms six hundred and thirty-seven days.

He signed and issued from Montpelier, during his absence from the capital, seventy-one commissions, one proclamation, and nine letters of credence to ministers accrediting them to foreign governments, and, as it appears, transacted generally all the necessary routine business incident to the executive office.

PRESIDENT MONROE

was absent from the capital during his presidential service of eight years seven hundred and eight days, independent of the year 1824 and the two months of 1825, for which period no data are found.

He transacted public business wherever he happened to be, sometimes at his farm in Virginia, again at his summer resort on the Chesapeake, and sometimes while traveling. He signed and issued, from these several places, away from the capital, numerous commissions to civil officers of the Government, exequaturs to foreign consuls, letters of credence, two letters to sovereigns, and thirty-seven pardons.

PRESIDENT JOHN Q. ADAMS

was absent from the capital, during his presidential term of four years, two hundred and twenty-two days. During such absence he performed official and public acts, signing and issuing commissions, exequaturs, pardons, proclamations, &c.

Referring to his absence in August and September, 1827, Mr. Adams, in his *Memoirs*, (vol. 8, p. 75,) says: "I left with him (the chief clerk) some blank signatures to be used when necessary, for proclamations, remission of penalties, and commissions of consuls, taking of him a receipt for the number and kind of blanks left with him, with directions to return me, when I came back, all the signed blanks remaining unused, and to keep and give me an account of all those that shall have been disposed of. This has been my constant practice with respect to signed blanks of this description. I do the same with regard to patents and land-grants."

PRESIDENT JACKSON

was absent from the capital during his presidential service of eight years five hundred and two days. He also performed executive duties and public acts while absent.

He appears to have signed and issued while absent from the capital very many public papers, embracing commissions, letters of credence, exequaturs, pardons, and among them four executive proclamations.

On the 26th June, 1833, he addressed a letter from Boston to Mr. Duane, Secretary of the Treasury, giving his views at large on the removal of the "deposits" from the United States Bank and placing them in the State banks, directing that the change, with all its arrangements, should be, if possible, completed by the 15th September following, and recommending that Amos Kendall should be appointed an agent of the Treasury Department to make the necessary arrangements with the State banks. Soon after (September 23) a paper signed by the President, and purporting to have been read to the Cabinet, was published in the newspapers of the day. Early in the next session of Congress a resolution passed the Senate inquiring of the President whether the paper was genuine or not, and if it was published by his authority, and requesting that a copy be laid before that body.

The President replied, avowing the genuineness of the paper and that it was published by his authority, but declined to furnish a copy to the Senate on the ground that it was purely executive business, and that the request of the Senate was an undue interference with the independence of the Executive, a co-ordinate branch of the Government.

In January, 1837, (26th,) he refused the privilege to a committee, under a resolution of the House of Representatives, to make a general investigation of the Executive Departments, without specific charges, on the ground, among others, that the use of the books, papers, &c., of the Departments for such purpose would interfere with the discharge of the public duties devolving upon the heads of the different Departments and necessarily disarrange and retard the public business.

PRESIDENT VAN BUREN

was absent from the capital during his presidential term one hundred and thirty-one days. He discharged executive duties, and performed official and public acts during these absences.

Among the papers signed by President Van Buren during his absence from the seat of Government, are commissions, one of these being for a United States judge of a district court, pardons, &c.

PRESIDENT TYLER

was absent from the capital during his presidential term one hundred and sixty-three days, and performed public acts and duties during such absences, signing public papers and documents to the number of twenty-eight, in which were included commissions, exequaturs, letters of credence, pardons, and one proclamation, making public the treaty of 1842 between the United States and Ecuador.

PRESIDENT POLK

was absent from the capital during his presidential term thirty-seven days, and appears to have signed but two official public papers during such absence.

PRESIDENT TAYLOR

was absent from the capital during the time he served as President thirty-one days, and while absent signed two commissions, three "full powers," two exequaturs, and the proclamation of August 11, 1849, relative to a threatened invasion of Cuba or some of the provinces of Mexico.

PRESIDENT FILLMORE

was absent from the capital during the time he served as President sixty days. During such absence he signed pardons, commissions, exequaturs, &c.

PRESIDENT PIERCE

was absent from the capital, in all, during his presidential term, fifty-seven days. The several periods of absence which make up this aggregate were each brief, and it does not appear that during these absences the President signed any public official documents except one pardon.

PRESIDENT BUCHANAN

was absent from the capital during his presidential term fifty-seven days, and the official papers which he is shown to have signed during such absence are three exequaturs and one letter of credence.

In addition to the public documents and papers executed by the several Presidents during their absences from the seat of Government, constant official correspondence was maintained by each with the heads of the different Executive Departments.



ABSENCE FROM THE UNITED STATES OF COL. EMORY UPTON AND OTHER OFFICERS OF THE ARMY.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Copies of instructions under which Lieut. Col. Emory Upton, Maj. George A. Forsyth, and Capt. Joseph P. Sanger are now absent from the United States.

MAY 12, 1876.—Referred to the Committee on Military Affairs and ordered to be printed.

WAR DEPARTMENT, May 8, 1876.

The Secretary of War has the honor to transmit to the House of Representatives, for the information of the Committee on Military Affairs, in response to request from Hon. C. D. McDougall, of said committee, copies of the instructions under which Lieut. Col. Emory Upton, Maj. George A. Forsyth, and Capt. Joseph Sanger, of the Army, are now absent from the United States.

ALPHONSO TAFT,
Secretary of War.

WAR DEPARTMENT,
Washington City, May 6, 1876.

Pursuant to section 882 of the Revised Statutes I hereby certify that the annexed are true copies from the records in this Department.

In witness whereof I have hereunto set my hand and caused the seal of the War Department to be affixed on the day and year first above written.

[SEAL.]

ALPHONSO TAFT,
Secretary of War.

WAR DEPARTMENT,
Washington City, June 23, 1875.

GENERAL: On or about June 30 next you will be relieved from the Military Academy.

Upon being so relieved it is desired that you proceed to San Francis-

co, Cal., visiting on the route to that city Salt Lake City, the mines of Nevada, and the Yosemite Valley; that on or about August 1 you sail from San Francisco for Japan and China. On reaching Canton, in China, you will proceed, via Singapore, to Calcutta, thence up the valley of the Ganges to Peshawer, and thence to the Russian possessions at Tashkend, by the most practicable route.

Should it, however, be found impracticable to proceed to the Russian possessions from Peshawer, you will select the most feasible route that will enable you to reach Europe. Having arrived in Europe, you are required to visit the camps of instruction and military schools of Italy, Germany, Austria, Russia, France, and England, and thence return to the United States.

The professional object of this order is to enable you to examine and report upon the organization, tactics, discipline, and the maneuvers of the armies along the route mentioned, and in Germany the special examination of the schools for the instruction of officers in strategy, grand tactics, applied tactics, and the higher duties in the art of war and the collection and compilation of such other information as might naturally be expected to be of utility to this Government.

During your absence upon this duty, which shall not exceed eighteen months, you will report, as nearly monthly as practicable, your address to the Adjutant-General; and on your return will make a full, detailed, written report to the Secretary of War upon all the subjects mentioned in this communication.

During such absence you will receive the full pay and allowances of a lieutenant-colonel, inclusive of fuel and quarters in kind at points where you may be stationed abroad, in quantity, at rates, and under regulations prevailing in Washington City for the time; provided that during such absence abroad you shall not be entitled to draw fuel and quarters in this country.

You shall also receive the traveling-allowances specified in General Orders Nos. 69 and 112 from the War Department, series of 1874, without the limitation of time for which charges of hotel-bills are subject under said order; provided that no hotel-bills or other items of travel-expenses shall be charged while sojourning at any point at which you may have hired quarters for the same time.

You will report to General Sherman for further instructions, if he desires to give you any; and you will be accompanied by Maj. George A. Forayth, Ninth Cavalry, and by Capt. J. P. Sanger, First Artillery, who have been detailed for that purpose.

Yours, very respectfully,

WM. W. BELKNAP,
Secretary of War.

General EMORY UPTON,
West Point, N. Y.

WAR DEPARTMENT,
Washington City, June 24, 1875.

SIR: You will receive instructions from the Adjutant-General of the Army to report to Lieut. Col. Emory Upton for special duty to be performed under his directions.

This duty will take you beyond the United States, and during your absence therefrom, which it is not contemplated will exceed eighteen months, you will receive the full pay and allowances of a major of cav-

alry, inclusive of fuel and quarters in kind at points where you may be stationed abroad, in quantity, at rates, and under regulations prevailing in Washington City for the time; provided that during such absence abroad you shall not be entitled to draw fuel and quarters in this country.

You shall also receive the traveling-allowances specified in General Orders Nos. 69 and 112 from the War Department, series of 1874, without the limitation of time to which charges of hotel-bills are subject under said orders; provided that no hotel-bills or other items of travel-expenses shall be charged while sojourning at any point at which you may have hired quarters for the same time.

During your absence abroad you will report monthly, or as nearly monthly as practicable, your address to the Adjutant-General of the Army.

Very respectfully, your obedient servant,

WM. M. BELKNAP,
Secretary of War.

Major GEORGE A. FORSYTH,
Ninth United States Cavalry, Chicago, Ill.

WAR DEPARTMENT,
Washington City, June 24, 1875.

SIR: You will receive instructions from the Adjutant-General of the Army to report to Lient. Col. Emory Upton for special duty to be performed under his directions.

This duty will take you beyond the United States, and during your absence therefrom, which it is not contemplated will exceed eighteen months, you will receive the full pay and allowances of a captain of artillery, inclusive of fuel and quarters in kind at points where you may be stationed abroad, in quantity, at rates, and under regulations prevailing in Washington City for the time; provided that during such absence abroad you shall not be entitled to draw fuel and quarters in this country.

You shall also receive the traveling-allowances specified in General Orders Nos. 69 and 112 from the War Department, series of 1874, without the limitation of time to which charges of hotel-bills are subject under said orders; provided that no hotel-bills or other items of travel-expenses shall be charged while sojourning at any point at which you may have hired quarters for the same time.

During your absence abroad you will report monthly, or as nearly monthly as practicable, your address to the Adjutant-General of the Army.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

Capt. J. P. SANGER,
First United States Artillery, Brunswick, Me.

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REDUCTION IN ESTIMATES FOR FISCAL YEAR ENDING
JUNE 30, 1877.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with a resolution of the House of April 7, 1876, a report of reductions in the estimates contained in the Book of Estimates for fiscal year ending June 30, 1877.

MAY 16, 1876.—Referred to the Committee on Appropriations and ordered to be printed.

WAR DEPARTMENT, May 15, 1876.

SIR: The Secretary of War has the honor to submit the following report of reductions from the estimates contained in the Book of Estimates for the fiscal year ending June 30, 1877, as requested by resolution of the House adopted April 7, 1876.

This report has been made after consultation with the heads of bureaus, division commanders, and the General of the Army, all of whom have rendered prompt assistance in ascertaining the lowest figures consistent with the efficiency of the service and safety of the country. It will be observed, from the accompanying tabular statement, that in the estimates "for recruiting," for "contingencies of the Adjutant-General's Office," for "the Signal Service," for the "pay and traveling and general expenses of the Army," and many other items, no reduction is recommended.

In the Quartermaster's Department, and in that of the Ordnance, the reductions are large, and in the Engineer Department considerable. The reduction of a million of dollars in the estimate for clothing and equipage is predicated upon the idea that, in the present capacity of the country to manufacture clothing, it is not necessary to accumulate supplies of that kind far beyond the actual demand for current use by the Army, and that the cost of preserving them from loss by moths and otherwise is a sufficient reason for reducing the surplus on hand as well as for avoiding large accumulations in future. By this large reduction the old stock will be so far exhausted during the year 1877 as to require an increased appropriation for the year 1878.

The reduction of a million of dollars in the estimates for the armament of fortifications is founded on the belief that the appropriations remaining after such reduction will strengthen our defenses as rapidly

as there is any present occasion for. The estimates for the Rock Island and the Benicia arsenals, as reduced, will equal the demand for the present uses, while the large additional structures for prospective uses, which must hereafter be made, may be safely postponed to a future session.

The reduction in the estimates for the "regular supplies of the Quartermaster's Department," for the "incidental expenses," for the "horses for cavalry and artillery," for "Army transportation," and for other items, as shown by the figures of the tabular statement, will require retrenchment and economy in the service, but I think not greater than will be found practicable.

The entire reduction from the Book of Estimates to which the resolution of the House refers is \$5,607,605.20.

Allow me to add that it seems to me important that the estimate for the building for the State, War, and Navy Departments should not be reduced. It will require the full amount to finish so much of the building as to afford a safe shelter for the valuable records of the War Department, which are now badly scattered and in unsafe buildings.

Respectfully,

ALPHONSO TAFT,
Secretary of War.

The SPEAKER of the House of Representatives.

REVISION OF ESTIMATES

PERTAINING TO THE

MILITARY ESTABLISHMENTS.

Revision of estimates pertaining

Under what officer of the War Department.	Title of appropriation.	Page on estimate-book of 1876-'77.	DIVISIONS ACCORD	
			THE ARMY APPROPRIATION BILL.	
			Estimates as originally submitted.	Estimates as revised by the Secretary of War.
General of the Army ..	Expenses of Commanding General's Office	67	\$5,000 00	\$5,000 00
Adjutant-General.....	Expenses of recruiting	67	107,920 00	107,920 00
	Contingencies, Adjutant-General's Department.	67	3,000 00	3,000 00
Chief Signal-Officer	Signal service	67	12,500 00	12,500 00
Paymaster-General	Pay, and traveling and general expenses of the Army.	67-70	12,840,288 50	12,840,288 50
Commissary-General ..	Pay of the Military Academy	70		
Quartermaster-General.	Subsistence of the Army	70-71	2,570,000 00	2,570,000 00
	Regular supplies of the Quartermaster's Department.	71	4,600,000 00	4,000,000 00
	Incidental expenses	72	1,500,000 00	1,150,000 00
	Horses for cavalry and artillery	72	400,000 00	250,000 00
	Army transportation	72	4,500,000 00	3,900,000 00
	Barracks and quarters	72	1,900,000 00	1,500,000 00
	Construction and repair of hospitals	72	100,000 00	100,000 00
	Clothing and equipage	73	1,500,000 00	500,000 00
	National cemeteries	73	250,000 00	125,000 00
Surgeon-General	Contingencies of the Army	73	100,000 00	75,000 00
	Medical and Hospital Department	73	225,000 00	225,000 00
	Medical museum and library	73	10,000 00	10,000 00
Chief of Engineers	Appliances for disabled soldiers	73	5,000 00	5,000 00
	Engineer depot at Willet's Point, N. Y. ..	73	10,000 00	5,000 00
Chief of Ordnance	Trials with torpedoes	73	10,000 00	10,000 00
	Ordnance service	73	200,000 00	125,000 00
	Ordnance, ordnance stores, and supplies: Manufacture of metallic ammunition for small-arms.	73	150,000 00	75,000 00
	Overhauling, cleaning, and preserving new ordnance stores on hand at the arsenals.	73	50,000 00	50,000 00
	Dismounting guns and removing the armaments, &c.	74	25,000 00	25,000 00
	Repairing, preserving, overhauling, painting, &c., the armaments, &c.	74	25,000 00	10,000 00
	Saddlers' tools and materials, &c. ...	74	25,000 00	
	Repairing ordnance and ordnance stores in the hands of troops.	74	25,000 00	20,000 00
	Repairing ordnance and ordnance stores for issue at the arsenals and depots.	74	25,000 00	20,000 00
	Purchase and manufacture of ordnance stores to fill requisitions of troops.	74	200,000 00	150,000 00
	Infantry, cavalry, and artillery equipments, consisting of, &c.	74	100,000 00	100,000 00
	Re-covering cavalry saddles with leather, manufacture, &c.	74	75,000 00	25,000 00
	Purchase of a site for powder depot, and its preparation, &c.	74	50,000 00	50,000 00
	Manufacture of arms at national armories.	74	500,000 00	250,000 00
	Armament of fortifications	74		
Superintendent of the Military Academy.	Current and ordinary expenses Military Academy.	75, 76		
	Miscellaneous items and incidental expenses Military Academy.	76, 77		
Chief of Ordnance	Springfield armory, Springfield, Mass., repairs and preservation, &c.	123		
	Rock Island arsenal, Rock Island, Ill. :			
	Shop G, an iron-working and finishing shop for the arsenal.	123		
	Shop I, a wood-working and leather-working shop for the arsenal.	123		
	Shop F, a rolling-mill and forging shop for the armory.	123		
	One block subaltern officers' quarters	123		
	A stone fire-proof building for offices	123		
	New machinery and shop fixtures ..	123		
	Sewers; building new roads; care, &c.	124		

to the military establishment.

ING TO CONGRESSIONAL BILLS OF 1875 AND PRIOR YEARS.						RESULTS.	
MILITARY ACADEMY BILL.				SUNDRY-CIVIL BILL.		Reductions made in the estimates of 1877 by the revision of the Secretary of War.	Difference between present bill and estimates originally submitted.
Estimates as originally submitted.	Amount proposed to be given by House of Representatives.	Amount proposed to be given by Senate.	Amount acceptable to Secretary of War.	Amount of estimates as originally submitted.	Estimates as revised by the Secretary of War.		
\$257,401 00	\$173,396 00	\$233,976 00	\$233,976 00			\$600,000 00	\$24,425 00
						350,000 00	
						150,000 00	
						600,000 00	
						400,000 00	
						1,000,000 00	
						125,000 00	
						25,000 00	
						5,000 00	
						75,000 00	
						75,000 00	
						15,000 00	
						25,000 00	
						5,000 00	
						5,000 00	
						50,000 00	
						50,000 00	
						250,000 00	
73,689 00	44,785 00	53,225 00	54,225 00	\$1,250,000 00	\$250,000 00	\$1,000,000 00	20,484 00
17,380 00	12,580 00	14,140 00	14,140 00				3,240 00
				20,000 00	20,000 00		
				200,000 00		200,000 00	
				65,000 00		65,000 00	
				170,000 00	170,000 00		
				27,700 00		27,700 00	
				78,000 00		78,000 00	
				27,500 00	27,500 00		
				22,000 00	22,000 00		

Revision of estimates pertaining to the

Under what officer of the War Department.	Title of appropriation.	Page on estimate-book of 1876-'77.	DIVISIONS ACCORD	
			THE ARMY APPROPRIATION BILL.	
			Estimates as originally submitted.	Estimates as revised by the Secretary of War.
Chief of Ordnance—Continued.	Improvement of water-power.	124		
	Care and preservation of the Rock Island bridge.	124		
	Benicia arsenal, Benicia, Cal.:			
	Items under this head numbered 1, 3, 5, 6, 7, 8, 9, 10, 11.	124		
	One machine-shop, (or item 2)	124		
	To build a wharf at south west corner of reserve, &c., (or item 4.)	124		
Chief of Engineers.....	Repairs of arsenals.	124		
	Fortifications and other works of defense.*	125, 126		
	Rivers and harbors—no revision, bill has passed House.†	127-132		
	Surveys of northern and northwestern lakes and Mississippi River.	132		
	Buildings and grounds in and around Washington:			
	Items under this head, 1 to 12, 14 to 16, 21, 22, 26 to 29, 34 to 37, 39 to 41.	133		
	And \$5,000 for repairs of water-pipes and fire-plugs, and \$2,000 for care and repair of bridges, (retained.)	134		
	Items under this head, 13, 17 to 19, 20, 23, 24, 25, 30 to 33, and 38, and \$5,000 for repairs of water-pipes and fire-plugs, and \$5,000 for Anacostia bridge, (dropped.)	133, 134		
	Washington Aqueduct:			
	Items 1, 2, and 3.....	134		
	Item 4.....	134		
	Items 5 and 6.....	134		
	Item 7.....	134		
Superintendent Public Buildings and Grounds.	Building cor. Seventeenth and F sts.	134		
	Building for State, War, and Navy Departments, east wing.	134		
Superintendent of the Military Academy.	Telegraph to connect, &c.	134		
Quartermaster-General.	Buildings and grounds Military Academy.	134		
Chief Signal-Officer....	Permanent buildings at sea-coast forts.	135	\$500,000 00	\$500,000 00
	Observation and report of storms.	152		
	Construction, maintenance, and repair military telegraph lines.	152		
Chief of Engineers.....	Surveys for military defenses.	153		
	Geographical surveys of Territories of the United States.	153		
Adjutant-General.....	Collection and payment of bounty, prize-money, &c.;	153		
Secretary of War.....	Expenses of military convicts.	153		
	Publication of official records of the war of the rebellion.	153		
	Refunding to States expenses incurred in raising volunteers.	153		
Adjutant-General.....	Support of the Leavenworth military prison.‡	153		
Secretary of War.....	Support of National Home for Disabled Volunteer Soldiers.	154		
	International Exhibition of 1876.	154		
Reductions made by Sec'y of War.			32,598,708 50	32,793,708 50
			3,805,000 00	

* The fortification bill has passed the House.

† The river and harbor bill has passed the House.

The foregoing table shows the reductions made by the Secretary of War on revision of the estimates WAR DEPARTMENT, May 15, 1876.

REDUCTION IN ESTIMATES OF APPROPRIATIONS.

7

military establishment—Continued.

ING TO CONGRESSIONAL BILLS OF 1875 AND PRIOR YEARS.				RESULTS.			
MILITARY ACADEMY BILL.				SUNDRY CIVIL BILL.			
Estimates as originally submitted.	Amount proposed to be given by House of Representatives.	Amount proposed to be given by Senate.	Amount acceptable to Secretary of War.	Amount of estimates as originally submitted.	Estimates as revised by the Secretary of War.	Reductions made in the estimates of 1877 by the revision of the Secretary of War.	Difference between present bill and estimates originally submitted.
				\$60,000 00		\$60,000 00	
				9,000 00	\$9,000 00		
				57,360 00	57,360 00		
				69,568 00		69,568 00	
				11,090 00		11,090 00	
				100,000 00	100,000 00		
				184,000 00	150,000 00	34,000 00	
				232,800 00	232,800 00		
				7,000 00	7,000 00		
				150,870 00		150,870 00	
				217,060 00	217,000 00		
				9,528 00		9,528 00	
				20,000 00	20,000 00		
				20,000 00		20,000 00	
				294 00	294 00		
				1,378,428 44	1,378,428 44		
				1,000 00	1,000 00		
\$39,000 00	\$500 00	\$3,500 00	\$3,500 00				\$20,500 00
				415,092 64	415,092 64		
				45,000 00	45,000 00		
				50,000 00	30,000 00	20,000 00	
				120,000 00	95,000 00	25,000 00	
				75,000 00	67,090 80	7,909 20	
				40,000 00	16,000 00	24,000 00	
				50,000 00	50,000 00		
				250,000 00	250,000 00		
				61,688 15	61,688 15		
				89,000 00	89,000 00		
437,470 00	231,241 00	308,841 00	309,841 00	5,583,919 23			128,629 00
				3,781,254 03	3,781,254 03		
				1,802,665 20		5,607,665 20	

* See letters of Secretary of War to Senate and House of Representatives of May 6, 1876.

† This item pertains to the legislative, executive, and judicial bill.

pursuant to House resolution of April 7, 1876.

ALPHONSO TAFT, *Secretary of War.*

THE RECORDING OF DEEDS, ETC., IN THE DISTRICT OF
COLUMBIA.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TO THE

House of Representatives, returning, without his approval, the bill of the House (H. R. 1922) entitled "An act providing for the recording of deeds, mortgages, and other conveyances affecting real estate in the District of Columbia."

MAY 26, 1876.—Referred to the Committee on the Judiciary and ordered to be printed.

To the House of Representatives :

I return herewith without my approval House bill No. 1922, entitled "An act providing for the recording of deeds, mortgages, and other conveyances affecting real estate in the District of Columbia."

The objection to affixing my signature to this bill may be found in the communication addressed to me by the Attorney-General, and which accompanies this message.

U. S. GRANT.

EXECUTIVE MANSION,
May 26, 1876.

DEPARTMENT OF JUSTICE,
Washington, May 23, 1876.

SIR : In reply to your note of the 19th instant, in which you request me to report whether there are objections to your approval of "An act providing for the recording of deeds, mortgages, and other conveyances affecting real estate in the District of Columbia," being House bill No. 1922, I have the honor to state that the bill seems to me objectionable because of indefiniteness and uncertainty as to the time which it purports to fix when deeds of trust, mortgages, &c., shall take effect and be valid as to creditors and subsequent purchasers for valuable consideration without notice.

Although there is no constitutional objection to the act, yet, for the reason above stated, I hesitate to advise its approval.

Very respectfully, your obedient servant,

EDWARDS PIERREPONT,
Attorney-General.

The PRESIDENT.

Forty-fourth Congress of the United States, at the first session, begun and held at the city of Washington, in the District of Columbia, on Monday, the sixth day of December, eighteen hundred and seventy-five.

AN ACT providing for the recording of deeds, mortgages, and other conveyances affecting real estate in the District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That sections four hundred and forty-six and four hundred and forty-seven, of the Revised Statutes, relating to the District of Columbia, passed at the first session of the Forty-third Congress, eighteen hundred and seventy-three and eighteen hundred and seventy-four, be, and the same hereby are, repealed; and there is enacted, in lieu thereof, the following: All deeds, deeds of trust, mortgages, conveyances, covenants, agreements, or any instrument of writing, which is by law entitled to be recorded in the office of the recorder of deeds, shall take effect and be valid, as to creditors, and as to subsequent purchasers for valuable consideration without notice, from the time when such deed, deed of trust, mortgage, conveyance, covenant, agreement, or instrument in writing shall have been acknowledged, proved, or certified, as the case may be, and delivered to the recorder of deeds for record, and from that time only; and the recorder of deeds shall note on each deed or other instrument of writing required by law to be recorded, the time of delivery of the same to him to be recorded.

SEC. 2. That this act shall not be so construed as to affect any deed or other instrument of writing heretofore recorded.

SAMUEL S. COX,

Speaker of the House of Representatives pro-tempore.

T. W. FERRY,

President of the Senate pro-tempore.

I certify that this act originated in the House of Representatives.

Attest:

GEO. M. ADAMS,

Clerk.



EXTENDING JURISDICTION OF COURT OF CLAIMS.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

IN REFERENCE TO

The bill of the House (H. R. 3481) extending the jurisdiction of the Court of Claims, together with accompanying papers.

MAY 29, 1876.—Referred to the Committee on Patents and ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, May 29, 1876.

SIR: I have the honor to acknowledge the receipt of your letter dated the 23d instant, inclosing copy of H. R. 3481, "extending the jurisdiction of the Court of Claims of the United States, and for other purposes," together with sundry papers relating thereto, and desiring to be furnished with information upon the several points contained therein, "especially so from the Patent-Office."

The letter and accompaniments were duly referred to the Commissioner of Patents for report upon the several questions presented therein, and I now have the honor to transmit, for the information of your honorable committee, a copy of a letter from that officer, dated the 25th instant, together with a copy of a report from the board of appeals of the Patent-Office, of even date herewith, upon the subject of your inquiry.

In compliance with your further request, I have the honor also to inclose a copy of your letter to me. The papers accompanying your communication are herewith returned.

I am, sir, very respectfully, your obedient servant,
Z. CHANDLER,
Secretary.

Hon. SAMUEL A. DOBBINS,
Chairman Subcommittee on Patents, House of Representatives.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT-OFFICE,
Washington, D. C., May 25, 1876.

SIR: In reply to your reference of the 24th instant, inclosing a communication from Hon. Samuel A. Dobbins, chairman of Subcommittee

on Patents, House of Representatives, relative to the House bill No. 3481, extending the jurisdiction of the Court of Claims of the United States over suits of infringement under letters-patent brought against the Government of the United States, and in which an expression of my views is requested on certain points therein submitted, I have the honor to state that the provisions of the bill in question, or some similar legislation, appears necessary to adequately protect the several Departments of the Government and their officials in the use of inventions that have or may become subjects of letters-patent.

Such a law has been long needed, and special acts have heretofore been passed for relief in particular cases. (See as an example joint resolution June 3, 1864, 13 Stat. at Large, p. 588.)

Referring now to the first inquiry proposed by Mr. Dobbins in his letter of the 23d as to the bill in question being so prepared as to enable the Government to make the same defense in the Court of Claims in a suit thereunder for the use of or infringement upon a patent that any individual, company, or corporation might make under the present patent laws of this country in a suit in the United States circuit court, I fail to find in the proposed act any express mention of any defense that the Government may set up in its behalf.

Section 4920, Revised Statutes, provides that—

In any action for infringement, the defendant may plead the general issue, and having given notice in writing to the plaintiff or his attorney thirty days before, may prove, on trial, any one or more of the following special matters:

First. That for the purpose of deceiving the public the description and specification filed by the patentee in the Patent-Office was made to contain less than the whole truth relative to his invention or discovery, or more than is necessary to produce the desired effect; or,

Second. That he had surreptitiously or unjustly obtained the patent for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same; or,

Third. That it had been patented or described in some printed publication prior to his supposed invention or discovery thereof; or,

Fourth. That he was not the original and first inventor or discoverer of any material and substantial part of the thing patented; or,

Fifth. That it had been in public use or on sale in this country for more than two years before his application for a patent, or had been abandoned to the public.

It will be seen by these several defenses here mentioned that the validity of the grant can be called in question; and it has been judicially determined that there is nothing to estop the Government of the United States from showing a patent which it had granted to have been a nullity *ab initio*, owing to the non-existence of the condition-precedent of novelty of the invention. *King vs. United States*, 10 Mo. Law. Rep., 631, (Court of Claims, 1857.)

Attorney-General Cushing had previously expressed the opinion that the validity of letters-patent remains open to inquiry, whether at the instance of private persons or of the United States. (Attorney-General's Decisions, December 24, 1856, p. 269.)

That the grant of a patent is not a warrant of its validity, but simply *prima-facie* evidence of that fact, has been determined by many decisions of the court.

I would therefore respectfully suggest that a clause be incorporated into the proposed act, declaring that the same defenses may be pleaded by the Government in all actions brought under the act in question as are allowed to be pleaded by any defendant in actions for infringement in the United States circuit courts.

Without this provision, or a similar one, the second question propounded by Mr. Dobbins, as to whether "the provisions of this bill are sufficient to protect the rights and interest of the Government in any

suits brought under it for the use or infringement of any letters-patent by the Government in any of the several Departments," must be answered in the negative.

In answer to the third inquiry, "Would it be right and proper for the Government, under the provisions of this bill, to pay for *the past* use of an invention covered by letters-patent of the United States for *all* the time the Government had used the invention and patent after the date of the same in the public service of the United States, and before the expiration of the patent," it would appear but just that some sort of limitation should be prescribed in which to bring an action for such use. A use by the Government in such cases would be so open and notorious that the same reasons, in part, for suing for past infringements, as in cases of private individuals, would not seem to exist. And it would but be reasonable, in my opinion, that the patentee, whose invention has been used by any Department of the Government, say, for the term of six years, without protest of any kind on the part of the patentee, should be barred from thereafter bringing suit. If the patent has expired before the bringing of the suit, the right of action should, of course, be barred altogether, as is now the practice between private parties in the United States courts, unless the patent should thereafter be extended by act of Congress.

In addition to the above suggestion, I would recommend that it be provided that in case where the validity of a patent has been sustained or overthrown in the circuit court, in action between private parties, the transcript of the proceedings in such court should have the same weight in the Court of Claims as the decisions of one court now have in another of similar jurisdiction.

The grounds for the proposed legislation are so fully discussed in the various communications accompanying your letter, and, in the main, so meet my approval, that I deem it unnecessary to present my views at length, and will, therefore, simply add, in conclusion, that a central tribunal for the determination of questions relating to patents arising between the various Departments of the Government and individual patentees will, in my opinion, accomplish the following valuable results:

First. Great convenience to the Government and a more adequate protection to its officials.

Second. A more expeditious determination of vexed questions of great importance.

Third. Uniformity of decisions in the vital matter of the measure of damages.

The letters and papers are herein respectfully returned.

Very respectfully, yours,

R. H. DUELL,

Commissioner of Patents.

The Hon. the SECRETARY OF THE INTERIOR.

UNITED STATES PATENT-OFFICE, May 29, 1876.

SIR: We are in receipt of the communication of Hon. Samuel A. Dobbins, chairman of Subcommittee on Patents of the House of Representatives, referred by you to this board for opinions upon certain interrogatories therein contained.

We have looked over the bill and papers accompanying the said communication, and, in reply to the first and second interrogatories, we have to say, that although we are unable to detect any defects or flaws in the bill, yet it would be presumptuous in us, with the little opportunity we

have had for examination and reflection, to give an off-hand opinion as to its operation and effect if enacted into law. Especially would our opinions appear of little importance or consequence after the approval of the bill by the Attorney-General upon mature consideration.

It is, however, in the power of Congress to provide further guards for the protection of the rights of Government, as was originally done in constituting the Court of Claims and in organizing the Southern Claims Commission.

We would also suggest, that while it may be equitable for the Government in cases of re-issued patents to pay compensation for the use of the invention before as well as after such re-issue, yet as such is not the law in regard to individuals, we question whether the discrimination should be made against Government as provided for by this bill in section 9.

Inventions being recognized by the Government as the property of the inventor which should be fostered and protected by special patents, and it being a recognized principle with all the peoples of the different States that private property should not be taken for public uses without just compensation; we see no good reason why a Government of the people, by the people, for the people should disregard this principle and turn piratical.

It would, of course, be right and proper for Government to pay, for the past as well as for the present and future use of inventions, a just compensation, to be established in view of the nature, cost, consequence, and value of the device employed and the amount of benefit received.

The letter of the chairman of the Subcommittee on Patents, and other papers accompanying your reference, are herewith returned.

Respectfully, your obedient servants,

R. L. B. CLARKE,
V. D. STOCKBRIDGE,
T. C. WOODWARD,

Board of Appeals.

Hon. Z. CHANDLER,
Secretary of the Interior.

WAR DEPARTMENT,
Washington City, October 16, 1875.

SIR: I have the honor to transmit, for your views, the inclosed letter from the Chief of Ordnance, dated the 4th instant, suggesting the propriety of an effort to secure from Congress necessary legislation under which proper compensation may be awarded to holders of patents used by the United States in the manufacture of war-material.

I beg to inquire your views as to expediency of uniting with this Department in recommending the subject to the favorable consideration of Congress, at the ensuing session.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The Hon. ATTORNEY-GENERAL.

DEPARTMENT OF JUSTICE,
Washington, October 19, 1875.

SIR: I have the honor to acknowledge the receipt of your letter of the 16th instant, inclosing a communication addressed to you on the 11th

by General S. V. Benét, Chief of Ordnance, together with an extract from his annual report for this year.

The subject suggested by these communications is that of the propriety of an effort to secure from Congress necessary legislation by which compensation may be awarded to holders of patents used by the United States in the manufacture of war-material. I concur fully with the views of General Benét concerning the necessity of such legislation, and will consider further of the subject, and communicate any suggestions which seem to me to be right and proper concerning the legislation to be asked for.

Very respectfully, your obedient servant,

EDWARDS PIERREPONT,

Attorney-General.

Hon. W. W. BELKNAP,

Secretary of War.

HOUSE OF REPRESENTATIVES,
COMMITTEE-ROOM ON PATENTS,
Washington, D. C., May 23, 1876.

SIR: I inclose herewith House bill No. 3481, "extending the jurisdiction of the Court of Claims of the United States, and for other purposes," for the purpose of obtaining information from your Department upon the several points contained therein, especially so from the Patent-Office, as herein indicated.

This bill is now pending before the Committee on Patents in the House. It has been referred to a subcommittee, of which I am chairman. Substantially the same bill has been to two other Departments of the Government for examination, opinion, and recommendation. The Secretary of War and the Attorney-General have each fully approved and recommended this bill for the favorable consideration of and action by Congress, as will appear from Executive Document No. 158, House of Representatives, Forty-fourth Congress, first session, and from other papers accompanying this letter.

This bill, relating particularly to patents and patented property, or property in patents created by the law of Congress and the grant thereunder upon mechanical inventions as held by the Supreme Court of the United States, it has been deemed best to transmit to you for investigation in the Patent-Office and for an opinion thereon, and, among other things, upon the following questions, to wit:

First. Is this bill so prepared, in general or in detail, as to enable the Government to make the same defense in the Court of Claims in a suit under this bill for the use of or infringement upon a patent that any individual person or company or corporation can or might make under the present patent laws of this country in a suit in the United States circuit court for an infringement of any letters-patent upon mechanical inventions?

Second, are the provisions of this bill sufficient, in your judgment, to protect the rights and interests of the Government in any suit brought under it for the use or infringement of any letters-patent by the Government, in any of the several Departments?

Third, would it be right and proper for the Government, under the provisions of this bill, to pay for *the past* use of an invention covered by letters-patent of the United States, for *all* the time the Government had

used the invention and patent *after* the date of the same, in the public service of the United States, and *before* the expiration of the patent ?

Any information or suggestions that you may be pleased to make with reference to this bill will be thankfully received, as the committee desire to consider as perfect a bill as possible to have; such a one as will protect this Government and the citizen alike upon the matters contained in the bill.

The committee understand that, under the patent-laws, there is in the Patent-Office a board of appeals, consisting of three persons of scientific and legal learning, by whom all appeal cases are heard and determined. The committee, therefore, request that this matter, bill and papers herein, be referred to that board, as the proper place to obtain the information hereby desired, subject, however, to your review and recommendation.

Please return to the committee the inclosed papers, and a copy of this letter, with such recommendations as you may be pleased to make.

An early reply is requested so as to get full action at this session of Congress.

Respectfully, your obedient servant,

SAMUEL A. DOBBINS,

Chairman of Subcommittee on Patents.

To the Hon. the SECRETARY OF THE INTERIOR.

H. R. 3481—FORTY-FOURTH CONGRESS, FIRST SESSION.

IN THE HOUSE OF REPRESENTATIVES, MAY 18, 1876.—Read twice, referred to the Committee on Patents, and ordered to be printed.

Mr. DOBBINS, by unanimous consent, introduced the following bill:

A bill extending the jurisdiction of the Court of Claims of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if the Secretary of War, or of the Navy, or of the Treasury, or of the Interior Department, or the Postmaster-General, or any other officer of the United States of America, has used, or shall hereafter use, in the public service, any invention upon which the letters-patent of said United States have been issued or re-issued or extended and renewed, whereby, and by means of which, such service has been, or is, improved or benefited, either in the saving of labor or in the reduction of expenses in the management of Government affairs, or if such service has been, is, or shall be, in any other way or manner improved or benefited, the Court of Claims of the United States is now and hereby vested with full and exclusive jurisdiction in and over any and all such cases, the same to be brought into and before said Court of Claims, by a petition or bill of complaint verified and filed in said court, in the manner and for the purposes herein provided; and whose duty shall be to hear, investigate, and determine any and all such cases submitted to said court, upon pleadings and proofs, in the manner herein provided for it to hear, investigate, and determine, and involving the following questions of fact for the consideration and judgment of said court, to wit:

First. The granting and issuing of the letters-patent, set forth by date and number thereof, and described in the petition or bill of complaint filed in said court in the manner substantially as hereinafter provided; and also the validity of such letters-patent, with the same jurisdiction and power that the circuit court of the United States now has over and upon such matter;

Second. The use of the improvements, invention, and letters-patent thereon in the business and service of said United States, and in what department, and for what purpose used, and the duration of that use;

Third. The compensation or sum of money to be paid by said United States, upon the evidence submitted, for such use of the improvements, invention, and letters-patent so applied to the public service; and,

Fourth. The right, title, and ownership of the letters-patent specified in the petition or bill of complaint in the manner aforesaid; and to whom the compensation for such use of invention and letters-patent thereon shall be awarded and paid by said United States.

SEC. 2. That if either of the said several departments have had, have, or shall have in use in the service and business of the United States, any improvements or invention upon which the letters-patent of said United States have been issued, the inventor and original patentee named in the letters-patent, or in any re-issue or any extension and renewal thereof, or any person or persons claiming to be the owner or owners of any interest in such letters-patent by a deed of assignment in writing, duly made and acknowledged before some officer having authority by law to take acknowledgments, and the same of record in the Patent-Office of said United States, the original deed of assignment so made and recorded, or a duly certified copy thereof, being produced and made a part of the said petition or bill of complaint, may make the said United States defendant, and thus and thereby give the said Court of Claims the jurisdiction contained in section one of this act upon the filing of a duly-verified petition or bill of complaint as herein provided in said court, and serving the Attorney-General with a duly-certified copy of the same so filed by the petitioner or complainant. The said petition or bill of complaint shall be in writing, and shall be the same, or substantially the same, as a bill in equity in the circuit court of the United States filed against an infringement of any letters-patent in that court, and shall set forth therein all the matters of fact which said Court of Claims is, by this act, required to pass upon and to determine at the final hearing of the case so referred or brought to the jurisdiction of said court, to which the Attorney-General of said United States shall make answer within thirty days, or such time as said court may fix upon, next after service upon him of a duly-certified copy of the said petition or bill so made and filed in the said Court of Claims; and upon the filing of such answer in said court, the issues shall be fully joined and the case ready for proofs, to be taken in the manner herein provided.

SEC. 3. That every such petition or bill of complaint shall be signed and sworn to by the petitioner or complainant aforesaid before a United States commissioner, or a commissioner of said Court of Claims, or before a judge of a court of record having a seal; and the same shall also be signed by the attorney and counsel of record for the petitioner or complainant in said Court of Claims; and, in like manner, the answer of the Government of said United States thereto shall be duly signed by the Attorney-General aforesaid in his official capacity. And after the filing of said answer in the manner hereinbefore stated and provided, eight days' notice, exclusive of the day of the service thereof, shall be given to said Attorney-General, by said petitioner or by the petitioner's attorney of record in said Court of Claims, of the time and place for the taking of such oral and documentary proofs as are intended to be used in such cause in support of the petition or bill of complaint so made and filed in said court, after which the said Attorney-General shall, in like manner, give notice of the time and place, and shall proceed to take such proofs as he may deem necessary in support of the answer so made and filed by him in the office of the clerk of said court. The proofs or evidence named, as aforesaid, may be taken by and before a United States commissioner, or a commissioner of said Court of Claims, or an examiner in equity in the United States circuit court, in the usual manner, and under the same rules as now practiced in patent causes in the said circuit court. After the direct and rebuttal proofs upon each side in any such cause have been taken and filed in the office of the clerk of said Court of Claims, such cause shall be deemed to be ready for argument and final hearing; and thereupon the same shall be put upon the current calendar or trial-docket of said court for such hearing and argument upon the evidence so taken and submitted by both the parties named in the petition or bill of complaint, or by either party thereto, upon the default of the other, or refusal to take proofs as herein provided; and the same shall then be proceeded with by that court to final judgment and decree in the usual manner established by said court with reference to the making and entering of final decrees and judgments.

SEC. 4. That the said Court of Claims shall fix upon and decree the rate of compensation, and the sum or amount of money to which the aforesaid inventor and original patentee, or his heirs, or assigns, or legal representative, may, upon the proofs, be entitled to have and to receive in the manner claimed in and by such petition or bill of complaint so made and filed in said court, and up to the time of adjudication by said Court of Claims; all of which shall be heard and determined upon the evidence taken and submitted to said court in the manner substantially as hereinbefore provided.

SEC. 5. That any one of the judges of said Court of Claims may, upon the written application of either party named as aforesaid, regulate, by an order in writing, duly signed by them, the time, place, and the manner for the taking of proofs or evidence to be used upon either or both sides in any cause brought within this act into said court in the manner aforesaid, so as to prevent unnecessary expense or delay by either party aforesaid; but due notice thereof shall first be given to the adverse party, and said application may be heard in open court, or at the chambers of the judge before whom said application is made; and in like manner, upon the written application of either party, said court may determine upon the time for the trial or final hearing and argument of any such cause so brought into said court.

SEC. 6. That if any person or persons claiming to own the whole or a part interest of the right and title to the invention and letters-patent thereon, by a good and valid deed of an assignment, made, executed, and of record in the manner hereinbefore made and provided, or otherwise claiming any interest therein, if there be any, who are not joined in such petition or bill aforesaid, shall be made party defendants therein with the said United States, and brought into said Court of Claims, or required therein to appear, upon such notice or order as the said court shall determine and direct; and thereupon the said Court of Claims shall have the same jurisdiction of each and every matter thereof as it has herein and hereby with reference to said inventor and original patentee, and shall hear and determine the same in the manner and with the same force and effect as hereinbefore provided.

SEC. 7. That if in any cause made and filed in the said Court of Claims, in the manner as provided for by this act, anybody shall have a good, sufficient, and valid deed of assignment and transfer of the invention and letters-patent named in the petition or bill of complaint aforesaid, or of any part thereof, and if the same be of record in the United States Patent-Office, as by law required, the same, if required, or a duly-certified copy thereof, shall be produced in evidence, in said Court of Claims, by the person or persons holding and owning it, for the inspection and opinion and judgment of said court thereon; and thereupon the said court shall have full jurisdiction of the same, and of all matters appertaining thereto, and may, upon evidence duly taken, as hereinbefore provided, proceed to hear such cause, and to determine each and every matter that may be at issue or involved in or by the evidence so taken and presented concerning such deed of assignment, and to whom any judgment that may be rendered, decreed, or ordered to be entered against said United States shall be paid; and in case an appeal be taken in the manner provided for in and by section twelve of this act, to the Supreme Court of the said United States, then that court may, in like manner, determine such matter and to whom the said United States shall pay any judgment so made, decreed, and entered by said Court of Claims. But if no such deed of assignment or a duly-certified copy thereof be offered and received in evidence in such cause before the closing of the direct or redirect evidence upon either side therein, then such cause shall be proceeded with, and heard and determined by said court in the manner hereinbefore made and provided. Any person who may have any knowledge or evidence concerning the matters involved in the petition or bill aforesaid, or in the answer thereto, may be examined as a witness, by and in behalf of the parties to such suit, or either of them.

SEC. 8. That any proofs or evidence taken in pursuance of the provisions contained in this act shall be duly certified to by the officer before whom and by whom the same is taken; and thereupon the same shall be securely sealed up by such officer, and by him transmitted to the clerk of said Court of Claims, in the same manner as now practiced in the said circuit court of the United States, or as required by the rules of practice in said Court of Claims, which shall be done within thirty days next after the taking of the same as aforesaid is completed. Duly-certified copies of any record-papers, other than that of deeds of assignment, or transfers, or licenses, may be used in evidence in any such cause in said court in the same manner and with the same effect as other evidence is used in or by said Court of Claims.

SEC. 9. That if such letters-patent have been renewed or extended by the Commissioner of Patents or by an act of Congress, or if the same have been re-issued either before or after any renewal or extension thereof, the jurisdiction of said Court of Claims, conferred by this act, shall apply to the same; and the right of recovery against said United States as herein provided for the use of the invention so patented, or re-issued, or renewed and extended, shall be under either the original letters-patent or any re-issue thereof, or under any renewed and extended term of the same; and the same, and each and every thereof, may be included in the same petition or bill of complaint, and the compensation for the use of the invention so patented shall be fixed and determined upon the length of time the same has been used in the public service by the direction of either of the Departments, or any officer named in section one of this act.

SEC. 10. That in case of the decease of said inventor and original patentee, or of any such assignee, either before or after the filing of any such petition or bill of complaint as aforesaid, then his administrator or executor, or administratrix or executrix, for the benefit of the heirs and estate of such deceased inventor and patentee, or of such assignee, shall be deemed, and shall be, the rightful and lawful party against said United States for all and every of the purposes mentioned and provided for in this act, and may prosecute the same to final judgment and decree in either or both of said courts, and shall be responsible and accountable to such estate therefor, in the same manner as provided by law in the State where such estate shall be situated at the time of the decease of such inventor and patentee or assignee.

SEC. 11. That each and every claim cognizable by the said court under this act shall be forever barred unless the petition or bill of complaint setting forth a statement of the case and claim, as herein required, be filed in said court within three years after

the cause of action first accrued: *Provided*, That any such claim which has accrued prior to the passage of this act shall not be barred if the petition or bill of complaint be filed in said court within two years after the passage of this act, and not more than six years after the expiration of the term of years for which the letters-patent were granted, or re-issued, or extended and renewed.

SEC. 12. That either party aforesaid may appeal to the Supreme Court of said United States within ninety days next after judgment or final decree shall have been made and ordered by said Court of Claims as hereinbefore provided; such cases so appealed to be preferred causes in said court; and if the said judgment or final decree shall not be appealed, or, if appealed, and the said judgment or final decree shall be affirmed by said Supreme Court, then the same shall be certified by the said Court of Claims to the Secretary of the Treasury of said United States in the same manner as now provided by the law in relation to any other judgment of said Court of Claims; and the same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by said court, and no longer; or such judgment may be paid by the Secretary of the Treasury of said United States out of any money in the said Treasury not otherwise appropriated, with the same effect as though the same had been paid out of any money appropriated for the payment of judgments of said Court of Claims or for private claims.

H. Ex. 167—2

3

EXTENDING JURISDICTION OF COURT OF CLAIMS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

The report of the Chief of Ordnance on the bill of the House (H. R. 3481) extending the jurisdiction of the Court of Claims.

MAY 29, 1876.—Referred to the Committee on Patents and ordered to be printed.

The Secretary of War has the honor to transmit to the House of Representatives the information of the report of the Chief of Ordnance on the bill of the House (H. R. 3481) extending the jurisdiction of the Court of Claims.

The views of the Chief of Ordnance are contained in the report.

WAR DEPARTMENT, May 27, 1876.

In order to transmit to the House of Representatives the Committee on Patents, in reference to the bill of the House (H. R. 3481), "extending the jurisdiction of the Court of Claims," and for other purposes.

A. A. TAFT,
Secretary of War.

HOUSE OF REPRESENTATIVES,
COMMITTEE ON PATENTS,
Washington, D. C., May 27, 1876.

At last, as the result of a Subcommittee of the House of Representatives, the bill No. 2865, "extending the jurisdiction of the Court of Claims of the United States," has been passed. On the 27th day of May, 1876, the bill was returned to the House of Representatives in conformity to the report of the Subcommittee, and also with favorable

report of the Subcommittee, 3171; being referred to the Attorney-General for his opinion on the 27th day of May, 1876. On the 27th day of May, 1876, the Attorney-General returned his report, approving, and recommending the bill, and also with favorable suggestions to the Committee.

and is now House bill No. 3481, "extending the jurisdiction of the Court of Claims of the United States, and for other purposes."

It has been thought best to transmit that bill to you for the purpose of ascertaining whether you concur in the amendments suggested by the Attorney-General, and whether you approve and recommend the bill as now inclosed herewith.

I will avail myself of this occasion to submit to you the following questions, to wit: First. Should the committee amend this bill by limiting the right to recover against the United States for the use of any invention, and letters-patent thereon, to the date of the passage of the bill, and not thereby provide for settlement and payment for *the past use* of any invention and patent now by the decisions of the courts made private property, would, in that case, the War Department obtain the relief suggested and sought for in the annual report of the Secretary of War, and also in the annual report of the Chief of Ordnance for the year 1875? Second. Should Congress fail to pass House bill 3481 at the present session, what would be the result or effect, if any, upon the public service and business of your Department?

Any suggestions that you may feel it your duty to make with reference to the inclosed bill will be thankfully received.

An early reply is respectfully requested.

I have the honor to be, your obedient servant,

SAM'L. A. DOBBINS,
Chairman Subcommittee.

The Hon. the SECRETARY OF WAR.

[Indorsements.]

Respectfully referred to the Chief of Ordnance for report.
By order of the Secretary of War.

H. T. CROSBY,
Chief Clerk.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, May 27, 1876.

Respectfully returned to the Secretary of War.

I have carefully examined House Representatives bill 3481, and concur in the amendments suggested by the Attorney-General as embodied therein.

In reply to the two questions propounded by Hon. Mr. Dobbins, I have the honor to state:

1st. If this bill should be amended so as to limit the right to recover against the United States to the date of the bill, and not provide for settlement and payment for the past use of any invention, &c., the War Department *will not obtain the relief* asked for, and pressed upon the attention of Congress in the annual reports from this office for several years past. The claims for past use of inventions would continue to embarrass the War Department, and the impossibility of a settlement, except through costly and protracted litigation, personally involving the officers of the Department, would be a great hardship both to them and to the inventors.

2d. Should Congress fail to pass this bill at the present session, it will leave the Department in the same condition in which it has been for many years, subjecting its officers to frequent suits for infringements of patents, which is onerous to the officers, and may result, in the event of the success of the suits, in embarrassing them in their private means.

A suit is now pending in the United States circuit court, district of Connecticut, against the commanding officer of the National Armory, Springfield, Mass., for acts done under the order of the War Department.

I strongly recommend the passage of House bill 3481 during the present session of Congress.

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

HOUSE EX. DOC. NO. 158, 44TH CONGRESS, 1ST SESSION.

Letter from the Secretary of War, transmitting letter, &c., from Chief of Ordnance on House bill 2865, relating to infringement on patents.

APRIL 12, 1876.—Referred to the Committee on Patents and ordered to be printed.

WAR DEPARTMENT,
April 11, 1876.

The Secretary of War has the honor to transmit to the House of Representatives, for the information of the Committee on Patents, in response to letter of the 10th instant from Hon. Samuel A. Dobbins, chairman of Subcommittee on Patents, a letter of the 10th instant from the Chief of Ordnance on House bill 2865, transmitting also an extract from his annual report of 1875 on infringement of patents, and copy of letter of October 11, 1875, to the Secretary of War, on the same subject, with recommendation.

ALPHONSO TAFT,
Secretary of War.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, April 10, 1876.

SIR: I have the honor to return House of Representatives bill No. 2865, "extending the jurisdiction of the Court of Claims, and for other purposes," now pending before the House Committee on Patents. I also transmit an extract from my annual report of 1875 on "infringement of patents," and copy of letter to the honorable Secretary of War, dated October 11, 1875, on the same subject.

The provisions of this bill, with the amendments, in writing, interlined and in margin, have my hearty approval, and will, it is believed, relieve the War Department from the great embarrassments which have been frequently brought to the attention of Congress in previous reports, and give a sure, speedy, and uniform method of settling the claims of patentees against the United States for the use of patents.

In the further interest of patentees and of the United States, I would respectfully recommend two additional amendments, which have been inserted in the margin in red ink, viz: page 2, line 18, after the word "provided," insert "such cases to be preferred causes in said court;" and on page 11, section 12, line 4, after the word "provided," insert "such cases, so appealed, to be preferred causes in said court." These additional amendments are necessary to avoid delay in the determination of said causes.

Respectfully, your obedient servant,

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

The Hon. the SECRETARY OF WAR.

H. R. 2865.—44TH CONGRESS, 1ST SESSION.

IN THE HOUSE OF REPRESENTATIVES, MARCH 27, 1876.—Read twice, referred to the Committee on Patents, and ordered to be printed.

MR. MARTIN I. TOWNSEND, on leave, introduced the following bill :

A BILL extending the jurisdiction of the Court of Claims, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if the Secretary of War, or of the Navy, or of the Treasury, or of the Interior Department, or the Postmaster-General, or any other officer of the United States of America, has used, or shall hereafter use, in the public service, either under or without an express or implied contract, any invention upon which the letters-patent of said United States have been issued or re-issued or extended and renewed, whereby, and by means of which, such service has been, or is, improved or benefited, either in the saving of labor or in the reduction of expenses in the management of Government affairs, or if such service has been, is, or shall be, in any other way or manner improved or benefited, the Court of Claims of the United States is now and hereby vested with full and complete jurisdiction in and over any and all such cases, the same to be brought into and before said Court of Claims, in the manner and for the purposes herein provided; such cases to be preferred causes in said court, and whose duty shall be to hear, investigate, and determine any and all such cases submitted to said court upon pleadings and proofs, in the manner herein provided for it to hear, investigate, and determine, and involving the following questions of fact for the consideration and judgment of said court, to wit:

First. The granting and issuing of the letters-patent, set forth by date and number thereof, and described in the petition or bill of complaint filed in said court in the manner substantially as hereinafter provided; and also the validity of such letters-patent, with the same jurisdiction and power that the circuit court of the United States now has over and upon such matter;

Second. The use of the improvements, invention, and letters-patent thereon in the business and service of said United States, and in what Department, and for what purpose used, and the duration of that use;

Third. The compensation or sum of money to be paid by said United States, upon the evidence submitted, for such use of the improvements, invention, and letters-patent so applied to the public service; and,

Fourth. The right, title, and ownership of the letters patent specified in the petition or bill of complaint in the manner aforesaid; and to whom the compensation for such use of invention and letters-patent thereon shall be awarded and paid by said United States.

SEC. 2. That in each and all cases where either of the several Departments or any officer of the Government of said United States, have put into use in the service of said Government of the United States any patented invention or improvements, the Cabinet officer at the head of the Department using such patented invention or improvements shall, if requested so to do by the written application of the inventor and original patentee, or his assignee or assignees, or either of them, of the invention so used, and within ten days thereafter, having been first furnished with a duly-verified copy of the petition or bill of complaint containing the facts and the grounds relied upon for recovery against said United States, in the manner herein provided, refer the same to said Court of Claims for the purposes herein named; whereupon that court shall proceed and take full and complete jurisdiction of each and every matter contained in such verified petition or bill of complaint, in the same manner provided in section one of this act; and shall hear and determine the same, and all matters contained in the answer thereto, in the manner herein provided.

SEC. 3. That if either of the said several Departments have had, have, or shall have in use in the service and business of the United States, any improvements or invention upon which the letters-patent of said United States have been issued, the inventor and original patentee named in the letters-patent, or in any re-issue or any extension and renewal thereof, or any person or persons claiming to be the owner or owners of any interest in such letters-patent by a deed of assignment in writing, duly made and acknowledged before some officer having authority by law to take acknowledgments, and the same of record in the Patent-Office of said United States, the original deed of assignment so made and recorded, or a duly-certified copy thereof, being produced and made a part of the said petition or bill of complaint, may make the said United States defendant, and thus and thereby give the said Court of Claims the jurisdiction contained in section one of this act. The said petition or bill of complaint shall be in writing, and shall be the same, or substantially the same, as a bill in equity in the circuit court of the United States filed against an infringement of any letters-patent in that court, and shall set forth therein all the matters of fact which said Court of Claims is, by this act, required to pass upon and to determine at the final hearing of the case so referred or brought to the jurisdiction of said court, to which the Attorney-General

of said United States shall make answer within thirty days next after service upon him of a duly-certified copy of the said petition or bill so made and filed with the clerk of said Court of Claims, and upon the filing of such answer with the clerk of said court, the issues shall be fully joined and the case ready for proofs, to be taken in the manner herein provided.

SEC. 4. That every such petition or bill of complaint shall be signed and sworn to by the petitioner or petitioners aforesaid before a United States commissioner, or a commissioner of said Court of Claims, or before a judge of a court of record having a seal; and the same shall also be signed by the attorney and counsel of record for the petitioner or petitioners in said Court of Claims; and in like manner the answer of the Government of said United States thereto shall be duly signed by the Attorney-General aforesaid in his official capacity. And after the filing of said answer in the manner hereinbefore stated and provided, eight days' notice, exclusive of the day of the service thereof, shall be given to said Attorney-General by said petitioner or by the petitioner's attorney of record in said Court of Claims, of the time and place for the taking of such oral and documentary proofs as are intended to be used in such cause in support of the petition or bill of complaint so made and filed in said court, after which the said Attorney-General shall, in like manner, give notice of the time and place, and shall proceed to take such proofs as he may deem necessary in support of the answer so made and filed by him in the office of the clerk of said court. The proofs or evidence named, as aforesaid, may be taken by and before a United States commissioner or a commissioner of said Court of Claims, or an examiner in equity in the United States circuit court, in the usual manner, and under the same rules as now practiced in patent causes in the said circuit court. After the direct and rebuttal proofs upon each side in any such cause have been taken and filed in the office of the clerk of said Court of Claims, such cause shall be deemed to be ready for argument and final hearing, and thereupon the same shall be put upon the current calendar or trial-docket of said court for such hearing and argument upon the evidence so taken and submitted by both the parties named in the petition or bill of complaint, or by either party thereto upon the default of the other or refusal to take proofs as herein provided; and the same shall then be proceeded with by that court to final judgment and decree in the usual manner established by said court with reference to the making and entering of final decrees and judgments.

SEC. 5. That the said Court of Claims shall fix upon and decree the rate of compensation, and the sum or amount of money to which the aforesaid inventor and original patentee, or his heirs, or assigns, or legal representatives may, upon the proofs, be entitled to have and to receive in the manner claimed in and by such petition or bill of complaint so made and filed in said court, and up to the time of adjudication by said Court of Claims; all of which shall be heard and determined upon the evidence taken and submitted to said court in the manner substantially as hereinbefore provided.

SEC. 6. That any three of the judges of said Court of Claims may, upon the written application of either party named as aforesaid, regulate, by an order in writing, duly signed by them, the time, place, and the manner for the taking of proofs or evidence to be used upon either or both sides in any cause brought within this act into said court in the manner aforesaid, so as to prevent unnecessary expense or delay by either party aforesaid; but due notice thereof shall first be given to the adverse party, and said application may be heard in open court, or at the chambers of the chief justice of said court; and in like manner upon the written application of either party, such judges may determine upon the time for the trial or final hearing and argument of any such cause so brought into said court.

SEC. 7. That if any person or persons claiming to own the whole or a part interest of the right and title to the invention and letters-patent thereon, by a good and valid deed of an assignment, made, executed, and of record in the manner hereinbefore made and provided, if there be any, who are not joined in such petition or bill aforesaid, shall be made party defendants therein with the said United States and brought into said Court of Claims or required therein to appear upon such notice or order as the said court shall determine and direct; and thereupon the said Court of Claims shall have the same jurisdiction of each and every matter thereof as it has herein and hereby with reference to said inventor and original patentee, and shall hear and determine the same in the manner and with the same force and effect as hereinbefore provided.

SEC. 8. That if in any cause made and filed in the said Court of Claims, in the manner as provided for by this act, anybody shall have a good, sufficient, and valid deed of assignment and transfer of the invention and letters-patent named in the petition or bill of complaint aforesaid, or of any part thereof, and if the same be of record in the United States Patent-Office as by law required, the same if required, or a duly-certified copy thereof, shall be produced in evidence in said Court of Claims by the person or persons holding and owning it, for the inspection and opinion and judgment of said court thereon; and thereupon the said court shall have full jurisdiction of the same and of

all matters appertaining thereto, and may, upon evidence duly taken as hereinbefore provided, proceed to hear such cause, and to determine each and every matter that may be at issue or involved in or by the evidence so taken and presented concerning such deed of assignment, and to whom any judgment that may be rendered, decreed, or ordered to be entered against said United States shall be paid; and in case an appeal be taken in the manner provided for in and by section twelve of this act, to the Supreme Court of the said United States, then that court may, in like manner, determine such matter and to whom the said United States shall pay any judgment so made, decreed, and entered by said Court of Claims. But if no such deed of assignment or a duly-certified copy thereof be offered and received in evidence in such cause before the closing of the direct or re-direct evidence upon either side therein, then such cause shall be proceeded with, and heard and determined by said court in the manner hereinbefore made and provided. Any person who may have any knowledge or evidence concerning the matters involved in the petition or bill aforesaid, or in the answer thereto, may be examined as a witness, by and in behalf of the parties to such suit, or either of them.

SEC. 9. That any proofs or evidence taken in pursuance of the provisions contained in this act shall be duly certified to by the officer before whom and by whom the same is taken, and thereupon the same shall be securely sealed up by such officer, and by him transmitted to the clerk of said Court of Claims, in the same manner as now practiced in the said circuit court of the United States, or as required by the rules of practice in said Court of Claims, which shall be done within thirty days next after the taking of the same as aforesaid is completed. Duly-certified copies of any record-papers, other than that of deeds of assignment, or transfers, or licenses, may be used in evidence in any such cause in said court in the same manner and with the same effect as other evidence is used in or by said Court of Claims.

SEC. 10. That if such letters-patent have been renewed or extended by the Commissioner of Patents or by an act of Congress, or if the same have been re-issued either before or after any renewal or extension thereof, the jurisdiction of said Court of Claims, conferred by this act, shall apply to the same; and the right of recovery against said United States as herein provided for the use of the invention so patented, or re-issued, or renewed or extended, shall be under either the original letters-patent or any re-issue thereof, or under any renewed and extended term of the same; and the same, and each and every thereof, may be included in the same petition or bill of complaint, and the compensation for the use of the invention so patented shall be fixed and determined upon the length of time the same has been used in the public service by the direction of either of the Departments, or any officer named in section one of this act.

SEC. 11. That in case of the decease of said inventor and original patentee, or of any such assignee, either before or after the filing of any such petition or bill of complaint as aforesaid, then his administrator or executor, or administratrix or executrix, for the benefit of the heirs and estate of such deceased inventor and patentee, or of such assignee, shall be deemed, and shall be, the rightful and lawful party against said United States for all and every of the purposes mentioned and provided for in this act, and may prosecute the same to final judgment and decree in either or both of said courts; and shall be responsible and accountable to such estate therefor, in the same manner as provided by law in the State where such estate shall be situated at the time of the decease of such inventor and patentee, or assignee.

SEC. 12. That either party aforesaid may appeal to the Supreme Court of said United States within thirty days next after judgment or final decree shall have been made and ordered by said Court of Claims as hereinbefore provided; such cases, so appealed, to be preferred causes in said court; and if the said judgment or final decree shall not be appealed, or, if appealed, and the said judgment or final decree shall be affirmed by said Supreme Court, then the same shall be certified by the said Court of Claims to the Secretary of the Treasury of said United States in the same manner as now provided by the law in relation to any other judgment of said Court of Claims; and the same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by the said court, and no longer; or such judgment may be paid by the Secretary of the Treasury of said United States out of any money in the said Treasury not otherwise appropriated, with the same effect as though the same had been paid out of any money appropriated for the payment of judgments of said Court of Claims or for private claims.

SEC. 13. That this act shall take effect immediately after its passage and approval.

INFRINGEMENT OF PATENTS.

I have the honor again to advert to the subject of patent-claims set up against this Department for alleged infringements in the productions at the National Armory, and at the several arsenals of construction. The Chief of Ordnance, in his report for the year 1873, gave a succinct statement of the state of those claims at that time. The claims on the Springfield rifle date back to the order of the Secretary of War of July 28, 1866, for the conversion of 50,000 muzzle-loaders to breech-loading arms. The skill and ingenuity of the officers and workmen of the Ordnance Department, brought into active operation previous to that time and continued to the present, has resulted in the production of as perfect a single breech-loading arm as will find its place in modern war. Its mechanism, it is claimed, has touched upon and appropriated in part the best features of several distinct and separate patents, some of which were perfected and re-issued after the work of the Government had begun, and whose owners are now seeking compensation for the same.

The consideration of a patent-case involves a careful weighing of many matters of fact relating to novelty, priority, &c., as well as an appreciation of equivalents and dissimilarities in mechanical structures and contrivances, and the proper application of the principles of patent-law to facts thus found. Where a device stands boldly out as the original type of its class, and the many questions of a character to affect the validity of the patent are in such a case reasonably free from doubt, it is apprehended that it would require but ordinary patent-expert skill to settle with certainty the merits of any question of infringement that might be raised; but where several claimants profess to cover by their patents the same identical device or combination, a proper regard to the several interests involved renders the matter more difficult of determination. An impartial settlement requires, in most cases, the assistance of the highest degree of expert skill and the exercise of the highest order of legal talent in the specialty of patent-law. The law prescribes a judicial method of settlement where private parties only are concerned, but the means of deciding properly between contending patentees and determining the amount of damages sustained by them, or any of them, where the Army workshops are concerned, are not vested in any portion of this Department, nor, indeed, as respects cases wherein the United States are properly the defendants, are they known to be vested in any Department of the Government at the present time.

The methods adopted by some of the claimants, of instituting suits in the United States circuit courts against officers of this Department for the alleged infringements, is onerous to the officers themselves, and can only result, in the event of the success of the suits, in embarrassing such officers in their private means, whereas the Government is the sole beneficiary in the use of the things which are the subject-matters of litigation. A recent opinion of the Attorney-General has inferentially decided that the executive officers of the Government are not authorized to settle the judgments, for past use, rendered in such suits, without authority of Congress to do so. This opinion has been the guide of this Bureau since that time. The officers, therefore, against whom judgments might be rendered would be put to the harassing necessity of securing special legislation for their relief in respect to matters over which they have had little or no power or control.

The indemnity due to public officers who have acted in pursuance of competent authority in the performance of their public duty, or who have in good faith exercised the discretion vested in them by law, is secured to a certain class of Government officials by general legislation. Collectors and other officers of the revenue are thus secured by section 959, Revised Statutes. It is therein enacted, that when a recovery is had in any suit or proceeding against such officer for any act done by him in the performance of his official duty, and the court certifies that there was probable cause for the act done by him, or that he acted under the direction of the Secretary of his Department, or other proper officer of the Government, no execution shall issue against him, but the amount so recovered shall, upon final judgment, be provided for and paid out of the proper appropriation from the Treasury. *Legislation similar to the foregoing, in favor of the officers of this Department against whom recoveries may be had for infringement of patents in the productions of the armory and arsenals, would be a practicable method of relieving this Bureau of a present embarrassment.*

It is believed, however, that, where several patents are alleged to cover a single complex device, each of these patents should be brought under the adjudication of a common tribunal, where the combined wisdom and experience necessary to the disposal of the whole number of cases could be brought to bear on each particular one in detail. If suits on such a device are brought by the several patentees in widely-separated jurisdictions, there is great liability of undue compensation being awarded to one patentee and inadequate remuneration to another, when the relative importance of the several patents is thereafter taken into account. It is, therefore, a question in the interest of the patentees themselves, as well as of public economy, whether some par-

ticular forum should not be named wherein claims of the character here referred to should be exclusively brought. The Court of Claims has denied its jurisdiction in cases of infringement of patent-rights by the Government, because such claims are held to sound in tort, and because the jurisdiction of the circuit courts is by law made exclusive in cases of patents. (See Pitcher's case, and Nock's case, 1 C. C. Repts., pp. 7 and 83.) Were it not, therefore, for these limitations upon the jurisdiction of the Court of Claims, this Department might readily refer all cases of alleged infringement for the decision of that tribunal under section 1063 of the Revised Statutes. Claimants before this Bureau for past use are now, however, without a remedy, except by personal actions against the officers of the Ordnance Department, (who have been and are acting under superior authority,) or by a direct application to Congress. As indicating the direction heretofore given by Congress to a complicated patent-case arising out of this Bureau, in order to secure for it the careful legal investigation which its importance demanded, attention is respectfully invited to the joint resolution of June 3, 1864, (13 S. L., p. 588,) referring the claim of William W. Hubbell to the Court of Claims. This claim was founded upon the use by the Government, to a very large extent, of devices covered by the patents of the claimant; and the court was directed to investigate and determine whether the claimant was the original inventor of the particular devices in question, and if he had a just and equitable right to compensation for the same. If so, what amount of compensation he was entitled to receive for the use of the inventions up to the time of adjudication, and for a full and entire transfer of his patents to the United States. This case, therefore, furnishes a precedent for the method of settling this class of cases; and, coupled with the advantages to accrue from the adjudication in a single tribunal of all patents where the United States is defendant, I would respectfully submit it to the wisdom of Congress *whether jurisdiction ought not to be given to the Court of Claims in all cases of the character here explained where the United States is defendant*. I earnestly recommend that some action may be taken at the coming session on this subject, which has engaged the attention of this Bureau for so long a time.

ORDNANCE-OFFICE, WAR DEPARTMENT,
Washington, October 11, 1875.

SIR: I have the honor to submit the propriety of soliciting from the Attorney-General his concurrence in an effort which I request may be made to secure from Congress the passage of an act authorizing this Department, whenever the public interest may demand it, to prosecute in the National Armory and the arsenals of construction the manufacture of articles of ordnance destined for public use in the military service, without regard to any patent-rights granted by the Government, and prescribing a judicial method of awarding compensation from the Treasurer to holders of patents upon their making it to appear in a proper tribunal that their letters-patent, being valid, are the subject of infringement by this Department, and showing the amount of compensation to which they are reasonably entitled.

The reasons which prompt me to make this request are the following:

Upon directions being given by the Secretary of War to this Bureau, any article of ordnance whatever must, by the rules of the military service, be purchased or manufactured in the public workshops of the armory and arsenals, if the appropriations for this branch of the service will permit the expenditure. Where machinery adequate to the production of articles ordered is not on hand, it also has to be purchased or manufactured as above.

It is out of these manufactures by the United States that much difficulty has arisen to this Bureau during the past few years; difficulties resulting from actual or supposed infringement of patent-rights held by private inventors, or by persons or corporations who have become the assignees of such rights.

Without attempting to enumerate all the instances that have occurred or may occur in this Department, it may be stated generally that few departures from known devices can be made in the Government workshops without originating a demand against the Department for allowance of royalty for infringement of letters-patent. The class of war-materials, like all other classes, is open to all the world for improvement; a not inconsiderable portion of the world avails itself of the opportunity, and this whole field of invention is overlaid with the paper grants of the Government under the laws for promoting the progress of science and the useful arts.

Did a patent granted by the Government convey *per se* an incontestable right to remuneration for any invasion of the same, one element of difficulty would be obviated in the consideration of questions relating to infringement; but, as the granting of a patent or a re-issue by the Patent-Office is a mere ministerial act, not professing to be a warranty of the franchise conferred, the recognition of such act as conclusive in any given case must be made in the face of all the possible infirmities which may inhere in it. That radical and fatal infirmities do exist in numbers of cases, the records of adjudications of patent cases in the courts will amply attest. Where, therefore, controversies are raised between owners of patents in which this Department may be considered as an infringer, it is manifestly not in the province of the Department to

settle contending rights, as the judicial machinery necessary to that end is nowhere vested in it. Meanwhile, however, the Department continues the manufacture or use, without the power to decide whose claim before it is the most meritorious.

Nor is there any plain, adequate remedy provided by law whereby claimants can obtain remuneration from the Government. The infringement of a patent has been held to partake of the nature of a *tort* on the part of the individual infringer; it has been so held by the Court of Claims in *Pitcher's case* and *Nock's case*, (1 C. C. Repts., pp 7 and 83,) and in the case of *Ely vs. Benton*, which was before the United States circuit court for the district of Massachusetts in 1871, the question whether or not the commanding officer of the National Armory was personally answerable in damages to the owner of a patent infringed in the manufactures under his direction at the armory was reserved on division for the decision of the United States Supreme Court. The question was never pressed before the Supreme Court, and may therefore be considered as yet an open one. It is for the settlement of this question, as well as for providing a method of remuneration from the Treasury to meritorious patentees, that legislation is now asked. The United States is the real beneficiary of the acts of its agents at the armory and arsenals, who can only act in obedience to the superior authority of the War Department.

Where manufactures or use by the United States have continued for any length of time without the consent of the holder of a patent, it has been held by the Attorney-General that no award of public moneys as damages can be made to such holder of patent without authority of Congress; the infringement being in the nature of a damage which an executive officer is not authorized to adjudicate upon.

Were there no other difficulties to be encountered in the settlement of these patent cases, the single question of "measure of damages" would take each case out of the jurisdiction of this department.

As before suggested, there is no judicial process under the control of this department by means of which the proper damages to be allowed may be estimated or determined. Between private parties actions for infringement may be either at law or in equity. At law "actual" damages alone are allowed, and these are to be found through the instrumentality of a *jury*, and are subject to be trebled by the judge at his discretion in favor of the party whose right is infringed. And it has been held (16 How., 480,) that "actual damages must be actually proved, and cannot be assumed as a legal inference from any facts which amount not to actual proof of the facts." In equity, besides the profits that may have accrued to the infringer, the complainant is entitled to recover the damages he has sustained, subject to being trebled, as at law, and the court is authorized to assess the damages or cause the same to be assessed. From the judgment or decrees in either form of action appeals are provided in the ordinary course of judicial procedure. A simple glance at these methods of settlement of cases of infringement between individuals, therefore, will show the inability of an executive officer (who is not invested with judicial functions and from whose judgment no judicial appeal in such cases is provided) to settle patent cases wherein the United States is concerned.

In the absence of any better method of disposing of the cases which have accrued in this Bureau, it has been the custom to refer them to the Department of Justice, with the request that an opinion might be expressed upon the validity of the patents, and that a method of settlement might be suggested. In one instance, the papers, after an opinion had been furnished by the Department of Justice, were referred to an officer of Ordnance, familiar with the subject-matter of the patents, for an opinion upon the amount of damages. Some of the cases are still pending in the Department of Justice.

Upon recent reflection I have arrived at the conclusion that the method adopted in these cases is not the best for subserving the individual interests of the claimants and of the Government, and the Department is powerless to afford relief in any case without the action of Congress. As this power has, in any event, to be invoked, I would recommend that general legislation be asked so as to cover all the cases. This can best be done by designating some special tribunal wherein actions may be brought against the Government for alleged infringement in the workshops and in the products of the Ordnance Department. My views in this regard are embraced in the inclosed extract from my annual report of this year, and the measure therein suggested is the one which I would earnestly ask may be submitted to the Attorney-General for his influence and support, if it should commend itself to his judgment.

I have the honor to be, very respectfully, your obedient servant,

S. V. BENÉT,
Brig. Gen., Chief of Ordnance.

The Hon. SECRETARY OF WAR.

H. EX. 168—2

H. R. 3481—FORTY-FOURTH CONGRESS, FIRST SESSION.

IN THE HOUSE OF REPRESENTATIVES, MAY 18, 1876.—Read twice, referred to the Committee on Patents, and ordered to be printed.

Mr. DOBBINS, by unanimous consent, introduced the following bill :

A bill extending the jurisdiction of the Court of Claims of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if the Secretary of War, or of the Navy, or of the Treasury, or of the Interior Department, or the Postmaster-General, or any other officer of the United States of America, has used, or shall hereafter use, in the public service, any invention upon which the letters-patent of said United States have been issued or re-issued or extended and renewed, whereby, and by means of which, such service has been, or is, improved or benefited, either in the saving of labor or in the reduction of expenses in the management of Government affairs, or if such service has been, is, or shall be, in any other way or manner improved or benefited, the Court of Claims of the United States is now and hereby vested with full and exclusive jurisdiction in and over any and all such cases, the same to be brought into and before said Court of Claims, by a petition or bill of complaint verified and filed in said court, in the manner and for the purposes herein provided ; and whose duty shall be to hear, investigate, and determine any and all such cases submitted to said court, upon pleadings and proofs, in the manner herein provided for it to hear, investigate, and determine, and involving the following questions of fact for the consideration and judgment of said court, to wit :

First. The granting and issuing of the letters-patent, set forth by date and number thereof, and described in the petition or bill of complaint filed in said court in the manner substantially as hereinafter provided ; and also the validity of such letters-patent, with the same jurisdiction and power that the circuit court of the United States now has over and upon such matter ;

Second. The use of the improvements, invention, and letters-patent thereon in the business and service of said United States, and in what department, and for what purpose used, and the duration of that use ;

Third. The compensation or sum of money to be paid by said United States, upon the evidence submitted, for such use of the improvements, invention, and letters-patent so applied to the public-service ; and,

Fourth. The right, title, and ownership of the letters-patent specified in the petition or bill of complaint in the manner aforesaid ; and to whom the compensation for such use of invention and letters-patent thereon shall be awarded and paid by said United States.

SEC. 2. That if either of the said several departments have had, have, or shall have in use in the service and business of the United States, any improvements or invention upon which the letters-patent of said United States have been issued, the inventor or original patentee named in the letters-patent, or in any re-issue or any extension and renewal thereof, or any person or persons claiming to be the owner or owners of any interest in such letters-patent by a deed of assignment in writing, duly made and acknowledged before some officer having authority by law to take acknowledgments, and the same of record in the Patent-Office of said United States, the original deed of assignment so made and recorded, or a duly-certified copy thereof, being produced and made a part of the said petition or bill of complaint, may make the said United States defendant, and thus and thereby give the said Court of Claims the jurisdiction contained in section one of this act upon the filing of a duly-verified petition or bill of complaint as herein provided in said court, and serving the Attorney-General with a duly-certified copy of the same so filed by the petitioner or complainant. The said petition or bill of complaint shall be in writing, and shall be the same, or substantially the same, as a bill in equity in the circuit court of the United States filed against an infringement of any letters-patent in that court, and shall set forth therein all the matters of fact which said Court of Claims is, by this act, required to pass upon and to determine at the final hearing of the case so referred or brought to the jurisdiction of said court, to which the Attorney-General of said United States shall make answer within thirty days, or such time as said court may fix upon, next after service upon him of a duly-certified copy of the said petition or bill so made and filed in the said Court of Claims ; and upon the filing of such answer in said court, the issues shall be fully joined and the case ready for proofs, to be taken in the manner herein provided.

SEC. 3. That every such petition or bill of complaint shall be signed and sworn to by the petitioner or complainant aforesaid before a United States commissioner, or a commissioner of said Court of Claims, or before a judge of a court of record having a seal ; and the same shall also be signed by the attorney and counsel of record for the petitioner or complainant in said Court of Claims ; and, in like manner, the answer of the Government of said United States thereto shall be duly signed by the Attorney-Gen-

eral aforesaid in his official capacity. And after the filing of said answer in the manner hereinbefore stated and provided, eight days' notice, exclusive of the day of the service thereof, shall be given to said Attorney-General, by said petitioner or by the petitioner's attorney of record in said Court of Claims, of the time and place for the taking of such oral and documentary proofs as are intended to be used in such cause in support of the petition or bill of complaint so made and filed in said court, after which the said Attorney-General shall, in like manner, give notice of the time and place, and shall proceed to take such proofs as he may deem necessary in support of the answer so made and filed by him in the office of the clerk of said court. The proofs or evidence named, as aforesaid, may be taken by and before a United States commissioner, or a commissioner of said Court of Claims, or an examiner in equity in the United States circuit court, in the usual manner, and under the same rules as now practiced in patent causes in the said circuit court. After the direct and rebuttal proofs upon each side in any such cause have been taken and filed in the office of the clerk of said Court of Claims, such cause shall be deemed to be ready for argument and final hearing; and thereupon the same shall be put upon the current calendar or trial-docket of said court for such hearing and argument upon the evidence so taken and submitted by both the parties named in the petition or bill of complaint, or by either party thereto, upon the default of the other, or refusal to take proofs as herein provided; and the same shall then be proceeded with by that court to final judgment and decree in the usual manner established by said court with reference to the making and entering of final decrees and judgments.

SEC. 4. That the said Court of Claims shall fix upon and decree the rate of compensation, and the sum or amount of money to which the aforesaid inventor and original patentee, or his heirs, or assigns, or legal representative, may, upon the proofs, be entitled to have and to receive in the manner claimed in and by such petition or bill of complaint so made and filed in said court, and up to the time of adjudication by said Court of Claims; all of which shall be heard and determined upon the evidence taken and submitted to said court in the manner substantially as hereinbefore provided.

SEC. 5. That any one of the judges of said Court of Claims may, upon the written application of either party named as aforesaid, regulate, by an order in writing, duly signed by them, the time, place, and the manner for the taking of proofs or evidence to be used upon either or both sides in any cause brought within this act into said court in the manner aforesaid, so as to prevent unnecessary expense or delay by either party aforesaid; but due notice thereof shall first be given to the adverse party, and said application may be heard in open court, or at the chambers of the judge before whom said application is made; and in like manner, upon the written application of either party, said court may determine upon the time for the trial or final hearing and argument of any such cause so brought into said court.

SEC. 6. That if any person or persons claiming to own the whole or a part interest of the right and title to the invention and letters-patent thereon, by a good and valid deed of an assignment, made, executed, and of record in the manner hereinbefore made and provided, or otherwise claiming any interest therein, if there be any, who are not joined in such petition or bill aforesaid, shall be made party defendants therein with the said United States, and brought into said Court of Claims, or required therein to appear, upon such notice or order as the said court shall determine and direct; and thereupon the said Court of Claims shall have the same jurisdiction of each and every matter thereof as it has herein and hereby with reference to said inventor and original patentee, and shall hear and determine the same in the manner and with the same force and effect as hereinbefore provided.

SEC. 7. That if in any cause made and filed in the said Court of Claims, in the manner as provided for by this act, anybody shall have a good, sufficient, and valid deed of assignment and transfer of the invention and letters-patent named in the petition or bill of complaint aforesaid, or of any part thereof, and if the same be of record in the United States Patent-Office, as by law required, the same, if required, or a duly-certified copy thereof, shall be produced in evidence, in said Court of Claims, by the person or persons holding and owning it, for the inspection and opinion and judgment of said court thereon; and thereupon the said court shall have full jurisdiction of the same, and of all matters appertaining thereto, and may, upon evidence duly taken, as hereinbefore provided, proceed to hear such cause, and to determine each and every matter that may be at issue or involved in or by the evidence so taken and presented concerning such deed of assignment, and to whom any judgment that may be rendered, decreed, or ordered to be entered against said United States shall be paid; and in case an appeal be taken in the manner provided for in and by section twelve of this act, to the Supreme Court of the said United States, then that court may, in like manner, determine such matter and to whom the said United States shall pay any judgment so made, decreed, and entered by said Court of Claims. But if no such deed of assignment or a duly-certified copy thereof be offered and received in evidence in such cause before the closing of the direct or redirect evidence upon either side therein, then such cause shall be proceeded with, and heard and determined by said court in the manner

hereinbefore made and provided. Any person who may have any knowledge or evidence concerning the matters involved in the petition or bill aforesaid, or in the answer thereto, may be examined as a witness, by and in behalf of the parties to such suit, or either of them.

SEC. 8. That any proofs or evidence taken in pursuance of the provisions contained in this act shall be duly certified to by the officer before whom and by whom the same is taken; and thereupon the same shall be securely sealed up by such officer, and by him transmitted to the clerk of said Court of Claims, in the same manner as now practiced in the said circuit court of the United States, or as required by the rules of practice in said Court of Claims, which shall be done within thirty days next after the taking of the same as aforesaid is completed. Duly-certified copies of any record-papers, other than that of deeds of assignment, or transfers, or licenses, may be used in evidence in any such cause in said court in the same manner and with the same effect as other evidence is used in or by said Court of Claims.

SEC. 9. That if such letters-patent have been renewed or extended by the Commissioner of Patents or by an act of Congress, or if the same have been re-issued either before or after any renewal or extension thereof, the jurisdiction of said Court of Claims, conferred by this act, shall apply to the same; and the right of recovery against said United States as herein provided for the use of the invention so patented, or re-issued, or renewed and extended, shall be under either the original letters-patent or any re-issue thereof, or under any renewed and extended term of the same; and the same, and each and every thereof, may be included in the same petition or bill of complaint, and the compensation for the use of the invention so patented shall be fixed and determined upon the length of time the same has been used in the public service by the direction of either of the Departments, or any officer named in section one of this act.

SEC. 10. That in case of the decease of said inventor and original patentee, or of any such assignee, either before or after the filing of any such petition or bill of complaint as aforesaid, then his administrator or executor, or administratrix or executrix, for the benefit of the heirs and estate of such deceased inventor and patentee, or of such assignee, shall be deemed, and shall be, the rightful and lawful party against said United States for all and every of the purposes mentioned and provided for in this act, and may prosecute the same to final judgment and decree in either or both of said courts, and shall be responsible and accountable to such estate therefor, in the same manner as provided by law in the State where such estate shall be situated at the time of the decease of such inventor and patentee or assignee.

SEC. 11. That each and every claim cognizable by the said court under this act shall be forever barred unless the petition or bill of complaint setting forth a statement of the case and claim, as herein required, be filed in said court within three years after the cause of action first accrued: *Provided*, That any such claim which has accrued prior to the passage of this act shall not be barred if the petition or bill of complaint be filed in said court within two years after the passage of this act, and not more than six years after the expiration of the term of years for which the letters-patent were granted, or re-issued, or extended and renewed.

SEC. 12. That either party aforesaid may appeal to the Supreme Court of said United States within ninety days next after judgment or final decree shall have been made and ordered by said Court of Claims as hereinbefore provided; such cases so appealed to be preferred causes in said court; and if the said judgment or final decree shall not be appealed, or, if appealed, and the said judgment or final decree shall be affirmed by said Supreme Court, then the same shall be certified by the said Court of Claims to the Secretary of the Treasury of said United States in the same manner as now provided by the law in relation to any other judgment of said Court of Claims; and the same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by said court, and no longer; or such judgment may be paid by the Secretary of the Treasury of said United States out of any money in the said Treasury not otherwise appropriated, with the same effect as though the same had been paid out of any money appropriated for the payment of judgments of said Court of Claims or for private claims.

EXTENDING JURISDICTION OF COURT OF CLAIMS.

LETTER

FROM

THE ATTORNEY GENERAL,

TRANSMITTING

Documents relative to the extension of the jurisdiction of the Court of Claims, and for other purposes.

MAY 18, 1876.—Referred to the Committee on Patents.

MAY 29, 1876.—Ordered to be printed.

DEPARTMENT OF JUSTICE,
Washington, May 17, 1876.

SIR: The Attorney-General, acknowledging the receipt of a letter of the 6th instant addressed to him by Hon. Samuel A. Dobbins, chairman of the Subcommittee on Patents, has the honor to return herewith Document No. 158, referred to in said letter, and bill No. 3171, the same being a substitute for House bill 2865, "extending the jurisdiction of the Court of Claims, and for other purposes." He has noted upon the bill itself the alterations and amendments which he desires to suggest.

In compliance with the request of Mr. Dobbins, a copy of the letter of the Secretary of War to the Attorney-General of October 16, 1875, and a copy of the answer thereto from this Department, dated October 19, 1875, are forwarded herewith.

Very respectfully, your obedient servant,

EDWARDS PIERREPONT,
Attorney-General.

Hon. M. C. KERR,
Speaker of the House of Representatives.

HOUSE OF REPRESENTATIVES,
ROOM OF COMMITTEE ON PATENTS,
May 6, 1876.

SIR: I inclose herewith Executive Document No. 158, Forty-fourth Congress, first session, House of Representatives, and respectfully request you to examine the same, especially so a bill (No. 2865) "extending the jurisdiction of the Court of Claims, and for other purposes,"

which you will please find on pages 2, 3, 4, and 5 of such document No. 158.

That bill is now pending before the Committee on Patents, and has been referred to a subcommittee, of which I am chairman.

It has been thought best to submit this bill to you for your opinion on the matters contained therein.

The reason why the committee do so you will find on pages 6 and 7 of the inclosed document No. 158 in a letter dated October 11, 1875, from the Chief of Ordnance to the honorable Secretary of War. Will you please forward a copy of your answer to the above-named letter in your answer to this; also of the letter of Secretary of War to the Attorney-General, inclosing the letter of October 11, 1875?

If you have any amendments to the bill to suggest please do so, as the committee desire to act understandingly in the matter so as to have a bill that shall protect the citizen-inventor and the Government in all the rights and privileges that belong to each. An early answer is desired and solicited.

Very respectfully, your obedient servant,

SAMUEL A. DOBBINS,

Chairman of Subcommittee on Patents.

HON. ATTORNEY-GENERAL of the United States.

HOUSE EX. DOC. NO. 158, 44TH CONGRESS, 1ST SESSION.

Letter from the Secretary of War, transmitting letter, &c., from Chief of Ordnance on House bill 2865, relating to infringement on patents.

APRIL 12, 1876.—Referred to the Committee on Patents and ordered to be printed.

WAR DEPARTMENT,

April 11, 1876.

The Secretary of War has the honor to transmit to the House of Representatives, for the information of the Committee on Patents, in response to letter of the 10th instant from Hon. Samuel A. Dobbins, chairman of Subcommittee on Patents, a letter of the 10th instant from the Chief of Ordnance on House bill 2865, transmitting also an extract from his annual report of 1875 on infringement of patents, and copy of letter of October 11, 1875, to the Secretary of War, on the same subject, with recommendation.

ALPHONSO TAFT,

Secretary of War.

ORDNANCE OFFICE, WAR DEPARTMENT,

Washington, April 10, 1876.

SIR: I have the honor to return House of Representatives bill No. 2865, "extending the jurisdiction of the Court of Claims, and for other purposes," now pending before the House Committee on Patents. I also transmit an extract from my annual report of 1875 on "infringement of patents," and copy of letter to the honorable Secretary of War, dated October 11, 1875, on the same subject.

The provisions of this bill, with the amendments, in writing, interlined and in margin, have my hearty approval, and will, it is believed, relieve the War Department from the great embarrassments which have been frequently brought to the attention of Congress in

previous reports, and give a sure, speedy, and uniform method of settling the claims of patentees against the United States for the use of patents.

In the further interest of patentees and of the United States, I would respectfully recommend two additional amendments, which have been inserted in the margin in red ink, viz: page 2, line 18, after the word "provided," insert "such cases to be preferred causes in said court;" and on page 11, section 12, line 4, after the word "provided," insert "such cases, so appealed, to be preferred causes in said court." These additional amendments are necessary to avoid delay in the determination of said causes.

Respectfully, your obedient servant,

S. V. BENÉT,

Brigadier-General, Chief of Ordnance.

The Hon. the SECRETARY OF WAR.

H. R. 2865.—44TH CONGRESS, 1ST SESSION.

IN THE HOUSE OF REPRESENTATIVES, MARCH 27, 1876.—Read twice, referred to the Committee on Patents, and ordered to be printed.

Mr. MARTIN I. TOWNSEND, on leave, introduced the following bill :

A BILL extending the jurisdiction of the Court of Claims, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if the Secretary of War, or of the Navy, or of the Treasury, or of the Interior Department, or the Postmaster-General, or any other officer of the United States of America, has used, or shall hereafter use, in the public service, either under or without an express or implied contract, any invention upon which the letters-patent of said United States have been issued or re-issued or extended and renewed, whereby, and by means of which, such service has been, or is, improved or benefited, either in the saving of labor or in the reduction of expenses in the management of Government affairs, or if such service has been, is, or shall be, in any other way or manner improved or benefited, the Court of Claims of the United States is now and hereby vested with full and complete jurisdiction in and over any and all such cases, the same to be brought into and before said Court of Claims, in the manner and for the purposes herein provided; such cases to be preferred causes in said court, and whose duty shall be to hear, investigate, and determine any and all such cases submitted to said court upon pleadings and proofs, in the manner herein provided for it to hear, investigate, and determine, and involving the following questions of fact for the consideration and judgment of said court, to wit :

First. The granting and issuing of the letters-patent, set forth by date and number thereof, and described in the petition or bill of complaint filed in said court in the manner substantially as hereinafter provided; and also the validity of such letters-patent, with the same jurisdiction and power that the circuit court of the United States now has over and upon such matter;

Second. The use of the improvements, invention, and letters-patent thereon in the business and service of said United States, and in what Department, and for what purpose used, and the duration of that use;

Third. The compensation or sum of money to be paid by said United States, upon the evidence submitted, for such use of the improvements, invention, and letters-patent so applied to the public service; and,

Fourth. The right, title, and ownership of the letters-patent specified in the petition or bill of complaint in the manner aforesaid; and to whom the compensation for such use of invention and letters-patent thereon shall be awarded and paid by said United States.

SEC. 2. That in each and all cases where either of the several Departments or any officer of the Government of said United States, have put into use in the service of said Government of the United States any patented invention or improvements, the Cabinet officer at the head of the Department using such patented invention or improvements shall, if requested so to do by the written application of the inventor and original patentee, or his assignee or assignees, or either of them, of the invention so used, and within ten days thereafter, having been first furnished with a duly-verified copy of the petition or bill of complaint containing the facts and the grounds relied upon for recovery against said United States, in the manner herein provided, refer the same to

said Court of Claims for the purposes herein named; whereupon that court shall proceed and take full and complete jurisdiction of each and every matter contained in such verified petition or bill of complaint, in the same manner provided in section one of this act; and shall hear and determine the same, and all matters contained in the answer thereto, in the manner herein provided.

SEC. 3. That if either of the said several Departments have had, have, or shall have in use in the service and business of the United States, any improvements or invention upon which the letters-patent of said United States have been issued, the inventor and original patentee named in the letters-patent, or in any re-issue or any extension and renewal thereof, or any person or persons claiming to be the owner or owners of any interest in such letters-patent by a deed of assignment in writing, duly made and acknowledged before some officer having authority by law to take acknowledgments, and the same of record in the Patent-Office of said United States, the original deed of assignment so made and recorded, or a duly-certified copy thereof, being produced and made a part of the said petition or bill of complaint, may make the said United States defendant, and thus and thereby give the said Court of Claims the jurisdiction contained in section one of this act. The said petition or bill of complaint shall be in writing, and shall be the same, or substantially the same, as a bill in equity in the circuit court of the United States filed against an infringement of any letters-patent in that court, and shall set forth therein all the matters of fact which said Court of Claims is, by this act, required to pass upon and to determine at the final hearing of the case so referred or brought to the jurisdiction of said court, to which the Attorney-General of said United States shall make answer within thirty days next after service upon him of a duly-certified copy of the said petition or bill so made and filed with the clerk of said Court of Claims, and upon the filing of such answer with the clerk of said court, the issues shall be fully joined and the case ready for proofs, to be taken in the manner herein provided.

SEC. 4. That every such petition or bill of complaint shall be signed and sworn to by the petitioner or petitioners aforesaid before a United States commissioner, or a commissioner of said Court of Claims, or before a judge of a court of record having a seal; and the same shall also be signed by the attorney and counsel of record for the petitioner or petitioners in said Court of Claims; and in like manner the answer of the Government of said United States thereto shall be duly signed by the Attorney-General aforesaid in his official capacity. And after the filing of said answer in the manner hereinbefore stated and provided, eight days' notice, exclusive of the day of the service thereof, shall be given to said Attorney-General by said petitioner or by the petitioner's attorney of record in said Court of Claims, of the time and place for the taking of such oral and documentary proofs as are intended to be used in such cause in support of the petition or bill of complaint so made and filed in said court, after which the said Attorney-General shall, in like manner, give notice of the time and place, and shall proceed to take such proofs as he may deem necessary in support of the answer so made and filed by him in the office of the clerk of said court. The proofs or evidence named, as aforesaid, may be taken by and before a United States commissioner or a commissioner of said Court of Claims, or an examiner in equity in the United States circuit court, in the usual manner, and under the same rules as now practiced in patent causes in the said circuit court. After the direct and rebuttal proofs upon each side in any such cause have been taken and filed in the office of the clerk of said Court of Claims, such cause shall be deemed to be ready for argument and final hearing, and thereupon the same shall be put upon the current calendar or trial-docket of said court for such hearing and argument upon the evidence so taken and submitted by both the parties named in the petition or bill of complaint, or by either party thereto upon the default of the other or refusal to take proofs as herein provided; and the same shall then be proceeded with by that court to final judgment and decree in the usual manner established by said court with reference to the making and entering of final decrees and judgments.

SEC. 5. That the said Court of Claims shall fix upon and decree the rate of compensation, and the sum or amount of money to which the aforesaid inventor and original patentee, or his heirs, or assigns, or legal representatives may, upon the proofs, be entitled to have and to receive in the manner claimed in and by such petition or bill of complaint so made and filed in said court, and up to the time of adjudication by said Court of Claims; all of which shall be heard and determined upon the evidence taken and submitted to said court in the manner substantially as hereinbefore provided.

SEC. 6. That any three of the judges of said Court of Claims may, upon the written application of either party named as aforesaid, regulate, by an order in writing, duly signed by them, the time, place, and the manner for the taking of proofs or evidence to be used upon either or both sides in any cause brought within this act into said court in the manner aforesaid, so as to prevent unnecessary expense or delay by either party aforesaid; but due notice thereof shall first be given to the adverse party, and said application may be heard in open court, or at the chambers of the chief justice of

said court; and in like manner upon the written application of either party, such judges may determine upon the time for the trial or final hearing and argument of any such cause so brought into said court.

SEC. 7. That if any person or persons claiming to own the whole or a part interest of the right and title to the invention and letters-patent thereon, by a good and valid deed of an assignment, made, executed, and of record in the manner hereinbefore made and provided, if there be any, who are not joined in such petition or bill aforesaid, shall be made party defendants therein with the said United States and brought into said Court of Claims or required therein to appear upon such notice or order as the said court shall determine and direct; and thereupon the said Court of Claims shall have the same jurisdiction of each and every matter thereof as it has herein and hereby with reference to said inventor and original patentee, and shall hear and determine the same in the manner and with the same force and effect as hereinbefore provided.

SEC. 8. That if in any cause made and filed in the said Court of Claims, in the manner as provided for by this act, anybody shall have a good, sufficient, and valid deed of assignment and transfer of the invention and letters-patent named in the petition or bill of complaint aforesaid, or of any part thereof, and if the same be of record in the United States Patent-Office as by law required, the same if required, or a duly-certified copy thereof, shall be produced in evidence in said Court of Claims by the person or persons holding and owning it, for the inspection and opinion and judgment of said court thereon; and thereupon the said court shall have full jurisdiction of the same and of all matters appertaining thereto, and may, upon evidence duly taken as hereinbefore provided, proceed to hear such cause, and to determine each and every matter that may be at issue or involved in or by the evidence so taken and presented concerning such deed of assignment, and to whom any judgment that may be rendered, decreed, or ordered to be entered against said United States shall be paid; and in case an appeal be taken in the manner provided for in and by section twelve of this act, to the Supreme Court of the said United States, then that court may, in like manner, determine such matter and to whom the said United States shall pay any judgment so made, decreed, and entered by said Court of Claims. But if no such deed of assignment or a duly-certified copy thereof be offered and received in evidence in such cause before the closing of the direct or redirect evidence upon either side therein, then such cause shall be proceeded with, and heard and determined by said court in the manner hereinbefore made and provided. Any person who may have any knowledge or evidence concerning the matters involved in the petition or bill aforesaid, or in the answer thereto, may be examined as a witness, by and in behalf of the parties to such suit, or either of them.

SEC. 9. That any proofs or evidence taken in pursuance of the provisions contained in this act shall be duly certified to by the officer before whom and by whom the same is taken, and thereupon the same shall be securely sealed up by such officer, and by him transmitted to the clerk of said Court of Claims, in the same manner as now practiced in the said circuit court of the United States, or as required by the rules of practice in said Court of Claims, which shall be done within thirty days next after the taking of the same as aforesaid is completed. Duly-certified copies of any record-papers, other than that of deeds of assignment, or transfers, or licenses, may be used in evidence in any such cause in said court in the same manner and with the same effect as other evidence is used in or by said Court of Claims.

SEC. 10. That if such letters-patent have been renewed or extended by the Commissioner of Patents or by an act of Congress, or if the same have been re-issued either before or after any renewal or extension thereof, the jurisdiction of said Court of Claims, conferred by this act, shall apply to the same; and the right of recovery against said United States as herein provided for the use of the invention so patented, or re-issued, or renewed or extended, shall be under either the original letters-patent or any re-issue thereof, or under any renewed and extended term of the same; and the same, and each and every thereof, may be included in the same petition or bill of complaint, and the compensation for the use of the invention so patented shall be fixed and determined upon the length of time the same has been used in the public service by the direction of either of the Departments, or any officer named in section one of this act.

SEC. 11. That in case of the decease of said inventor and original patentee, or of any such assignee, either before or after the filing of any such petition or bill of complaint as aforesaid, then his administrator or executor, or administratrix or executrix, for the benefit of the heirs and estate of such deceased inventor and patentee, or of such assignee, shall be deemed, and shall be, the rightful and lawful party against said United States for all and every of the purposes mentioned and provided for in this act, and may prosecute the same to final judgment and decree in either or both of said courts; and shall be responsible and accountable to such estate therefor, in the same manner as provided by law in the State where such estate shall be situated at the time of the decease of such inventor and patentee, or assignee.

SEC. 12. That either party aforesaid may appeal to the Supreme Court of said United

States within thirty days next after judgment or final decree shall have been made and ordered by said Court of Claims as hereinbefore provided; such cases, so appealed, to be preferred causes in said court; and if the said judgment or final decree shall not be appealed, or, if appealed, and the said judgment or final decree shall be affirmed by said Supreme Court, then the same shall be certified by the said Court of Claims to the Secretary of the Treasury of said United States in the same manner as now provided by the law in relation to any other judgment of said Court of Claims; and the same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by the said court, and no longer; or such judgment may be paid by the Secretary of the Treasury of said United States out of any money in the said Treasury not otherwise appropriated, with the same effect as though the same had been paid out of any money appropriated for the payment of judgments of said Court of Claims or for private claims.

SEC. 13. That this act shall take effect immediately after its passage and approval.

INFRINGEMENT OF PATENTS.

I have the honor again to advert to the subject of patent-claims set up against this Department for alleged infringements in the productions at the National Armory, and at the several arsenals of construction. The Chief of Ordnance, in his report for the year 1873, gave a succinct statement of the state of those claims at that time. The claims on the Springfield rifle date back to the order of the Secretary of War of July 28, 1866, for the conversion of 50,000 muzzle-loaders to breech-loading arms. The skill and ingenuity of the officers and workmen of the Ordnance Department, brought into active operation previous to that time and continued to the present, has resulted in the production of as perfect a single breech-loading arm as will find its place in modern war. Its mechanism, it is claimed, has touched upon and appropriated in part the best features of several distinct and separate patents, some of which were perfected and re-issued after the work of the Government had begun, and whose owners are now seeking compensation for the use.

The consideration of a patent-case involves a careful weighing of many matters of fact relating to novelty, priority, &c., as well as an appreciation of equivalents and dissimilarities in mechanical structures and contrivances, and the proper application of the principles of patent-law to facts thus found. Where a device stands boldly out as the original type of its class, and the many questions of a character to affect the validity of the patent are in such a case reasonably free from doubt, it is apprehended that it would require but ordinary patent-expert skill to settle with certainty the merits of any question of infringement that might be raised; but where several claimants profess to cover by their patents the same identical device or combination, a proper regard to the several interests involved renders the matter more difficult of determination. An impartial settlement requires, in most cases, the assistance of the highest degree of expert skill and the exercise of the highest order of legal talent in the specialty of patent-law. The law prescribes a judicial method of settlement where private parties only are concerned, but the means of deciding properly between contending patentees and determining the amount of damages sustained by them, or any of them, where the Army workshops are concerned, are not vested in any portion of this Department, nor, indeed, as respects cases wherein the United States are properly the defendants, are they known to be vested in any Department of the Government at the present time.

The methods adopted by some of the claimants, of instituting suits in the United States circuit courts against officers of this Department for the alleged infringements, is onerous to the officers themselves, and can only result, in the event of the success of the suits, in embarrassing such officers in their private means, whereas the Government is the sole beneficiary in the use of the things which are the subject-matters of litigation. A recent opinion of the Attorney-General has inferentially decided that the executive officers of the Government are not authorized to settle the judgments, for past use, rendered in such suits, without authority of Congress to do so. This opinion has been the guide of this Bureau since that time. The officers, therefore, against whom judgments might be rendered would be put to the harassing necessity of securing special legislation for their relief in respect to matters over which they have had little or no power or control.

The indemnity due to public officers who have acted in pursuance of competent authority in the performance of their public duty, or who have in good faith exercised

the discretion vested in them by law, is secured to a certain class of Government officials by general legislation. Collectors and other officers of the revenue are thus secured by section 989, Revised Statutes. It is therein enacted, that when a recovery is had in any suit or proceeding against such officer for any act done by him in the performance of his official duty, and the court certifies that there was probable cause for the act done by him, or that he acted under the direction of the Secretary of his Department, or other proper officer of the Government, no execution shall issue against him, but the amount so recovered shall, upon final judgment, be provided for and paid out of the proper appropriation from the Treasury. *Legislation similar to the foregoing, in favor of the officers of this Department against whom recoveries may be had for infringement of patents in the productions of the armory and arsenals, would be a practicable method of relieving this Bureau of a present embarrassment.*

It is believed, however, that, where several patents are alleged to cover a single complex device, each of these patents should be brought under the adjudication of a common tribunal, where the combined wisdom and experience necessary to the disposal of the whole number of cases could be brought to bear on each particular one in detail. If suits on such a device are brought by the several patentees in widely-separated jurisdictions, there is great liability of undue compensation being awarded to one patentee and inadequate remuneration to another, when the relative importance of the several patents is thereafter taken into account. It is, therefore, a question in the interest of the patentees themselves, as well as of public economy, whether some particular forum should not be named wherein claims of the character here referred to should be exclusively brought. The Court of Claims has denied its jurisdiction in cases of infringement of patent-rights by the Government, because such claims are held to sound in *tort*, and because the jurisdiction of the circuit courts is by law made exclusive in cases of patents. (See *Pitcher's case*, and *Nock's case*, 1 C. C. Repts., pp. 7 and 83.) Were it not, therefore, for these limitations upon the jurisdiction of the Court of Claims, this Department might readily refer all cases of alleged infringement for the decision of that tribunal under section 1063 of the Revised Statutes. Claimants before this Bureau for past use are now, however, without a remedy, except by personal actions against the officers of the Ordnance Department, (who have been and are acting under superior authority,) or by a direct application to Congress. As indicating the direction heretofore given by Congress to a complicated patent-case arising out of this Bureau, in order to secure for it the careful legal investigation which its importance demanded, attention is respectfully invited to the joint resolution of June 3, 1864, (13 S. L., p. 588,) referring the claim of William W. Hubbell to the Court of Claims. This claim was founded upon the use by the Government, to a very large extent, of devices covered by the patents of the claimant; and the court was directed to investigate and determine whether the claimant was the original inventor of the particular devices in question, and if he had a just and equitable right to compensation for the same. If so, what amount of compensation he was entitled to receive for the use of the inventions up to the time of adjudication, and for a full and entire transfer of his patents to the United States. This case, therefore, furnishes a precedent for the method of settling this class of cases; and, coupled with the advantages to accrue from the adjudication in a single tribunal of all patents where the United States is defendant, I would respectfully submit it to the wisdom of Congress *whether jurisdiction ought not to be given to the Court of Claims in all cases of the character here explained where the United States is defendant.* I earnestly recommend that some action may be taken at the coming session on this subject, which has engaged the attention of this Bureau for so long a time.

ORDNANCE-OFFICE, WAR DEPARTMENT,
Washington, October 11, 1875.

SIR: I have the honor to submit the propriety of soliciting from the Attorney-General his concurrence in an effort which I request may be made to secure from Congress the passage of an act authorizing this Department, whenever the public interest may demand it, to prosecute in the National Armory and the arsenals of construction the manufacture of articles of ordnance destined for public use in the military service, without regard to any patent-rights granted by the Government, and prescribing a judicial method of awarding compensation from the Treasurer to holders of patents upon their making it to appear in a proper tribunal that their letters-patent, being valid, are the subject of infringement by this Department, and showing the amount of compensation to which they are reasonably entitled.

The reasons which prompt me to make this request are the following:

Upon directions being given by the Secretary of War to this Bureau, any article of ordnance whatever must, by the rules of the military service, be purchased or manufactured in the public workshops of the armory and arsenals, if the appropriations for this branch of the service will permit the expenditure. Where machinery adequate to the production of articles ordered is not on hand, it also has to be purchased or manufactured as above.

It is out of these manufactures by the United States that much difficulty has arisen

to this Bureau during the past few years; difficulties resulting from actual or supposed infringement of patent-rights held by private inventors, or by persons or corporations who have become the assignees of such rights.

Without attempting to enumerate all the instances that have occurred or may occur in this Department, it may be stated generally that few departures from known devices can be made in the Government workshops without originating a demand against the Department for allowance of royalty for infringement of letters-patent. The class of war-materials, like all other classes, is open to all the world for improvement; a not inconsiderable portion of the world avails itself of the opportunity, and this whole field of invention is overlaid with the paper grants of the Government under the laws for promoting the progress of science and the useful arts.

Did a patent granted by the Government convey *per se* an incontestable right to remuneration for any invasion of the same, one element of difficulty would be obviated in the consideration of questions relating to infringement; but, as the granting of a patent or a re-issue by the Patent-Office is a mere ministerial act, not professing to be a warranty of the franchise conferred, the recognition of such act as conclusive in any given case must be made in the face of all the possible infirmities which may inhere in it. That radical and fatal infirmities do exist in numbers of cases, the records of adjudications of patent cases in the courts will amply attest. Where, therefore, controversies are raised between owners of patents in which this Department may be considered as an infringer, it is manifestly not in the province of the Department to settle contending rights, as the judicial machinery necessary to that end is nowhere vested in it. Meanwhile, however, the Department continues the manufacture or use, without the power to decide whose claim before it is the most meritorious.

Nor is there any plain, adequate remedy provided by law whereby claimants can obtain remuneration from the Government. The infringement of a patent has been held to partake of the nature of a *tort* on the part of the individual infringer; it has been so held by the Court of Claims in *Pitcher's case* and *Nock's case*, (1 C. C. Repts., pp. 7 and 83,) and in the case of *Ely vs. Benton*, which was before the United States circuit court for the district of Massachusetts in 1871, the question whether or not the commanding officer of the National Armory was personally answerable in damages to the owner of a patent infringed in the manufactures under his direction at the armory was reserved on division for the decision of the United States Supreme Court. The question was never pressed before the Supreme Court, and may therefore be considered as yet an open one. It is for the settlement of this question, as well as for providing a method of remuneration from the Treasury to meritorious patentees, that legislation is now asked. The United States is the real beneficiary of the acts of its agents at the armory and arsenals, who can only act in obedience to the superior authority of the War Department.

Where manufactures or use by the United States have continued for any length of time without the consent of the holder of a patent, it has been held by the Attorney-General that no award of public moneys as damages can be made to such holder of patent without authority of Congress; the infringement being in the nature of a damage which an executive officer is not authorized to adjudicate upon.

Were there no other difficulties to be encountered in the settlement of these patent cases, the single question of "measure of damages" would take each case out of the jurisdiction of this department.

As before suggested, there is no judicial process under the control of this department by means of which the proper damages to be allowed may be estimated or determined. Between private parties actions for infringement may be either at law or in equity. At law "actual" damages alone are allowed, and these are to be found through the instrumentality of a *jury*, and are subject to be trebled by the judge at his discretion in favor of the party whose right is infringed. And it has been held (16 How., 480,) that "actual damages must be actually proved, and cannot be assumed as a legal inference from any facts which amount not to actual proof of the facts." In equity, besides the profits that may have accrued to the infringer, the complainant is entitled to recover the damages he has sustained, subject to being trebled, as at law, and the court is authorized to assess the damages or cause the same to be assessed. From the judgment or decrees in either form of action appeals are provided in the ordinary course of judicial procedure. A simple glance at these methods of settlement of cases of infringement between individuals, therefore, will show the inability of an executive officer (who is not invested with judicial functions and from whose judgment no judicial appeal in such cases is provided) to settle patent cases wherein the United States is concerned.

In the absence of any better method of disposing of the cases which have accrued in this Bureau, it has been the custom to refer them to the Department of Justice, with the request that an opinion might be expressed upon the validity of the patents, and that a method of settlement might be suggested. In one instance, the papers, after an opinion had been furnished by the Department of Justice, were referred to an officer of Ordnance, familiar with the subject-matter of the patents, for an opinion upon the amount of damages. Some of the cases are still pending in the Department of Justice.

Upon recent reflection I have arrived at the conclusion that the method adopted in these cases is not the best for subserving the individual interests of the claimants and of the Government, and the Department is powerless to afford relief in any case without the action of Congress. As this power has, in any event, to be invoked, I would recommend that general legislation be asked so as to cover all the cases. This can best be done by designating some special tribunal wherein actions may be brought against the Government for alleged infringement in the workshops and in the products of the Ordnance Department. My views in this regard are embraced in the inclosed extract from my annual report of this year, and the measure therein suggested is the one which I would earnestly ask may be submitted to the Attorney-General for his influence and support, if it should commend itself to his judgment.

I have the honor to be, very respectfully, your obedient servant,

S. V. BENÉT,

Brig. Gen., Chief of Ordnance.

The Hon. SECRETARY OF WAR.

H. R. 3481—FORTY-FOURTH CONGRESS, FIRST SESSION.

IN THE HOUSE OF REPRESENTATIVES, MAY 18, 1876.—Read twice, referred to the Committee on Patents, and ordered to be printed.

Mr. DOBBINS, by unanimous consent, introduced the following bill:

A bill extending the jurisdiction of the Court of Claims of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if the Secretary of War, or of the Navy, or of the Treasury, or of the Interior Department, or the Postmaster-General, or any other officer of the United States of America, has used, or shall hereafter use, in the public service, any invention upon which the letters-patent of said United States have been issued or re-issued or extended or renewed, whereby, and by means of which, such service has been, or is, improved or benefited, either in the saving of labor or in the reduction of expenses in the management of Government affairs, or if such service has been, is, or shall be, in any other way or manner improved or benefited, the Court of Claims of the United States is now and hereby vested with full and exclusive jurisdiction in and over any and all such cases, the same to be brought into and before said Court of Claims, by a petition or bill of complaint verified and filed in said court, in the manner and for the purposes herein provided; and whose duty shall be to hear, investigate, and determine any and all such cases submitted to said court, upon pleadings and proofs, in the manner herein provided for it to hear, investigate, and determine, and involving the following questions of fact for the consideration and judgment of said court, to wit:

First. The granting and issuing of the letters-patent, set forth by date and number thereof, and described in the petition or bill of complaint filed in said court in the manner substantially as hereinafter provided; and also the validity of such letters-patent, with the same jurisdiction and power that the circuit court of the United States now has over and upon such matter;

Second. The use of the improvements, invention, and letters-patent thereon in the business and service of said United States, and in what department, and for what purpose used, and the duration of that use;

Third. The compensation or sum of money to be paid by said United States, upon the evidence submitted, for such use of the improvements, invention, and letters-patent so applied to the public service; and,

Fourth. The right, title, and ownership of the letters-patent specified in the petition or bill of complaint in the manner aforesaid; and to whom the compensation for such use of invention and letters-patent thereon shall be awarded and paid by said United States.

SEC. 2. That if either of the said several departments have had, have, or shall have in use in the service and business of the United States, any improvements or invention upon which the letters-patent of said United States have been issued, the inventor and original patentee named in the letters-patent, or in any re-issue or any extension and renewal thereof, or any person or persons claiming to be the owner or owners of any interest in such letters-patent by a deed of assignment in writing, duly made and acknowledged before some officer having authority by law to take acknowledgments, and the same of record in the Patent-Office of said United States, the original deed of assignment so made and recorded, or a duly certified copy thereof, being produced and made a part of the said petition or bill of complaint, may make the said United States defendant, and thus and thereby give the said Court of Claims the jurisdiction contained in section one of this act upon the filing of a duly-verified petition

or bill of complaint as herein provided in said court, and serving the Attorney-General with a duly-certified copy of the same so filed by the petitioner or complainant. The said petition or bill of complaint shall be in writing, and shall be the same, or substantially the same, as a bill in equity in the circuit court of the United States filed against an infringement of any letters-patent in that court, and shall set forth therein all the matters of fact which said Court of Claims is, by this act, required to pass upon and to determine at the final hearing of the case so referred or brought to the jurisdiction of said court, to which the Attorney-General of said United States shall make answer within thirty days, or such time as said court may fix upon, next after service upon him of a duly-certified copy of the said petition or bill so made and filed in the said Court of Claims; and upon the filing of such answer in said court, the issues shall be fully joined and the case ready for proofs, to be taken in the manner herein provided.

SEC. 3. That every such petition or bill of complaint shall be signed and sworn to by the petitioner or complainant aforesaid before a United States commissioner, or a commissioner of said Court of Claims, or before a judge of a court of record having a seal; and the same shall also be signed by the attorney and counsel of record for the petitioner or complainant in said Court of Claims; and, in like manner, the answer of the Government of said United States thereto shall be duly signed by the Attorney-General aforesaid in his official capacity. And after the filing of said answer in the manner hereinbefore stated and provided, eight days' notice, exclusive of the day of the service thereof, shall be given to said Attorney-General, by said petitioner or by the petitioner's attorney of record in said Court of Claims, of the time and place for the taking of such oral and documentary proofs as are intended to be used in such cause in support of the petition or bill of complaint so made and filed in said court, after which the said Attorney-General shall, in like manner, give notice of the time and place, and shall proceed to take such proofs as he may deem necessary in support of the answer so made and filed by him in the office of the clerk of said court. The proofs or evidence named, as aforesaid, may be taken by and before a United States commissioner, or a commissioner of said Court of Claims, or an examiner in equity in the United States circuit court, in the usual manner, and under the same rules as now practiced in patent causes in the said circuit court. After the direct and rebuttal proofs upon each side in any such cause have been taken and filed in the office of the clerk of said Court of Claims, such cause shall be deemed to be ready for argument and final hearing; and thereupon the same shall be put upon the current calendar or trial-docket of said court for such hearing and argument upon the evidence so taken and submitted by both the parties named in the petition or bill of complaint, or by either party thereto, upon the default of the other, or refusal to take proofs as herein provided; and the same shall then be proceeded with by that court to final judgment and decree in the usual manner established by said court with reference to the making and entering of final decrees and judgments.

SEC. 4. That the said Court of Claims shall fix upon and decree the rate of compensation, and the sum or amount of money to which the aforesaid inventor and original patentee, or his heirs, or assigns, or legal representative, may, upon the proofs, be entitled to have and to receive in the manner claimed in and by such petition or bill of complaint so made and filed in said court, and up to the time of adjudication by said Court of Claims; all of which shall be heard and determined upon the evidence taken and submitted to said court in the manner substantially as hereinbefore provided.

SEC. 5. That any one of the judges of said Court of Claims may, upon the written application of either party named as aforesaid, regulate, by an order in writing, duly signed by them, the time, place, and the manner for the taking of proofs or evidence to be used upon either or both sides in any cause brought within this act into said court in the manner aforesaid, so as to prevent unnecessary expense or delay by either party aforesaid; but due notice thereof shall first be given to the adverse party, and said application may be heard in open court, or at the chambers of the judge before whom said application is made; and in like manner, upon the written application of either party, said court may determine upon the time for the trial or final hearing and argument of any such cause so brought into said court.

SEC. 6. That if any person or persons claiming to own the whole or a part interest of the right and title to the invention and letters-patent thereon, by a good and valid deed of an assignment, made, executed, and of record in the manner hereinbefore made and provided, or otherwise claiming any interest therein, if there be any, who are not joined in such petition or bill aforesaid, shall be made party defendants therein with the said United States, and brought into said Court of Claims, or required therein to appear, upon such notice or order as the said court shall determine and direct; and thereupon the said Court of Claims shall have the same jurisdiction of each and every matter thereof as it has herein and hereby with reference to said inventor and original patentee, and shall hear and determine the same in the manner and with the same force and effect as hereinbefore provided.

SEC. 7. That if in any cause made and filed in the said Court of Claims, in the man-

ner as provided for by this act, anybody shall have a good, sufficient, and valid deed of assignment and transfer of the invention and letters-patent named in the petition or bill of complaint aforesaid, or of any part thereof, and if the same be of record in the United States Patent-Office, as by law required, the same, if required, or a duly-certified copy thereof, shall be produced in evidence, in said Court of Claims, by the person or persons holding and owning it, for the inspection and opinion and judgment of said court thereon; and thereupon the said court shall have full jurisdiction of the same, and of all matters appertaining thereto, and may, upon evidence duly taken, as hereinbefore provided, proceed to hear such cause, and to determine each and every matter that may be at issue or involved in or by the evidence so taken and presented concerning such deed of assignment, and to whom any judgment that may be rendered, decreed, or ordered to be entered against said United States shall be paid; and in case an appeal be taken in the manner provided for in and by section twelve of this act, to the Supreme Court of the said United States, then that court may, in like manner, determine such matter and to whom the said United States shall pay any judgment so made, decreed, and entered by said Court of Claims. But if no such deed of assignment or a duly-certified copy thereof be offered and received in evidence in such cause before the closing of the direct or redirect evidence upon either side therein, then such cause shall be proceeded with, and heard and determined by said court in the manner hereinbefore made and provided. Any person who may have any knowledge or evidence concerning the matters involved in the petition or bill aforesaid, or in the answer thereto, may be examined as a witness, by and in behalf of the parties to such suit, or either of them.

SEC. 8. That any proofs or evidence taken in pursuance of the provisions contained in this act shall be duly certified to by the officer before whom and by whom the same is taken; and thereupon the same shall be securely sealed up by such officer, and by him transmitted to the clerk of said Court of Claims, in the same manner as now practiced in the said circuit court of the United States, or as required by the rules of practice in said Court of Claims, which shall be done within thirty days next after the taking of the same as aforesaid is completed. Duly-certified copies of any record-papers, other than that of deeds of assignment, or transfers, or licenses, may be used in evidence in any such cause in said court in the same manner and with the same effect as other evidence is used in or by said Court of Claims.

SEC. 9. That if such letters-patent have been renewed or extended by the Commissioner of Patents or by an act of Congress, or if the same have been re-issued either before or after any renewal or extension thereof, the jurisdiction of said Court of Claims, conferred by this act, shall apply to the same; and the right of recovery against said United States as herein provided for the use of the invention so patented, or re-issued, or renewed and extended, shall be under either the original letters-patent or any re-issue thereof, or under any renewed and extended term of the same; and the same, and each and every thereof, may be included in the same petition or bill of complaint, and the compensation for the use of the invention so patented shall be fixed and determined upon the length of time the same has been used in the public service by the direction of either of the Departments, or any officer named in section one of this act.

SEC. 10. That in case of the decease of said inventor and original patentee, or of any such assignee, either before or after the filing of any such petition or bill of complaint as aforesaid, then his administrator or executor, or administratrix or executrix, for the benefit of the heirs and estate of such deceased inventor and patentee, or of such assignee, shall be deemed, and shall be, the rightful and lawful party against said United States for all and every of the purposes mentioned and provided for in this act, and may prosecute the same to final judgment and decree in either or both of said courts, and shall be responsible and accountable to such estate therefor, in the same manner as provided by law in the State where such estate shall be situated at the time of the decease of such inventor and patentee or assignee.

SEC. 11. That each and every claim cognizable by the said court under this act shall be forever barred unless the petition or bill of complaint setting forth a statement of the case and claim, as herein required, be filed in said court within three years after the cause of action first accrued: *Provided*, That any such claim which has accrued prior to the passage of this act shall not be barred if the petition or bill of complaint be filed in said court within two years after the passage of this act, and not more than six years after the expiration of the term of years for which the letters-patent were granted, or re-issued, or extended and renewed.

SEC. 12. That either party aforesaid may appeal to the Supreme Court of said United States within ninety days next after judgment or final decree shall have been made and ordered by said Court of Claims as hereinbefore provided; such cases so appealed to be preferred causes in said court; and if the said judgment or final decree shall not be appealed, or, if appealed, and the said judgment or final decree shall be affirmed by said Supreme Court, then the same shall be certified by the said Court of Claims to the Secretary of the Treasury of said United States in the same manner as now provided by the law in relation to any other judgment of said Court of Claims; and the

same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by said court, and no longer; or such judgment may be paid by the Secretary of the Treasury of said United States out of any money in the said Treasury not otherwise appropriated, with the same effect as though the same had been paid out of any money appropriated for the payment of judgments of said Court of Claims or for private claims.

WAR DEPARTMENT,
Washington City, October 16, 1875.

SIR: I have the honor to transmit for your views the inclosed letter from the Chief of Ordnance, dated the 4th instant, suggesting the propriety of an effort to secure from Congress necessary legislation under which proper compensation may be awarded to holders of patents used by the United States in the manufacture of war material.

I beg to inquire your views as to the expediency of uniting with this Department in recommending the subject to the favorable consideration of Congress at the ensuing session.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The Hon. ATTORNEY-GENERAL.

DEPARTMENT OF JUSTICE,
Washington, October 19, 1875.

SIR: I have the honor to acknowledge the receipt of your letter of the 16th instant, inclosing a communication addressed to you on the 11th by General S. V. Benét, Chief of Ordnance, together with an extract from his annual report for this year.

The subject suggested by these communications is that of the propriety of an effort to secure from Congress necessary legislation by which compensation may be awarded to holders of patents used by the United States in the manufacture of war material. I concur fully with the views of General Benét, concerning the necessity of such legislation, and will consider further on the subject, and communicate any suggestions which seem to me to be right and proper concerning the legislation to be asked for.

Very respectfully, your obedient servant,

EDWARDS PIERREPONT,
Attorney-General.

Hon. W. W. BELKNAP,
Secretary of War.

PROTECTION OF AMERICAN CITIZENS IN THE OTTOMAN
EMPIRE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RESPONSE TO

A resolution of the House of Representatives, transmitting a report from the Secretary of State, with accompanying papers, concerning steps taken to protect American citizens in the Ottoman Empire.

MAY 31, 1876.—Referred to the Committee on Foreign Affairs and ordered to be printed.

To the House of Representatives:

I transmit, in answer to a resolution of the House of Representatives of the 22d instant, a report of the Secretary of State with its accompanying papers.

U. S. GRANT.

WASHINGTON, May 31, 1876.

DEPARTMENT OF STATE,
Washington, May 29, 1876.

The Secretary of State, to whom was referred the following resolution of the House of Representatives of the 22d instant:

Whereas it has been reported that violence has been done, and is menaced, to Christians who are subjects of various Christian powers, resident in the dominions of the Ottoman Empire; and whereas there are American citizens who are resident in said dominions for purposes of commerce and for other objects, and who may be liable to danger by reason of the facts reported: Therefore,

Be it resolved, That the President of the United States be requested, if not incompatible with the public interests, to inform this House whether he has any official or other information in respect to the matters before stated; whether any steps have been taken by the Executive for the protection of any American citizens resident in said dominions; and that the President be requested to take such measures as shall be within his power to extend and secure such protection to all American citizens so resident therein, has the honor to lay before the President the correspondence that has taken place about the matters to which the resolution refers. The telegram from Mr. Maynard is the only official information on the subject

2 PROTECTION OF AMERICAN CITIZENS IN OTTOMAN EMPIRE.

that has been received by the Department, and nothing further is known in regard to it, except as gathered from the reports in the public prints. The correspondence will also indicate the course that has been pursued by the Government for the protection of American citizens in the Ottoman dominions.

Respectfully submitted.

HAMILTON FISH.

To the PRESIDENT.

List of the accompanying papers.

Telegram from Mr. Maynard, received May 12, 1876.

Mr. Cadwalader to Mr. Robeson, May 12, 1876.

Mr. Fish to Mr. Robeson, May 16, 1876.

Mr. Robeson to Mr. Fish, May 20, 1876.

Mr. Fish to Mr. Maynard, No. 58, May 20, 1876.

[Telegram, in cipher.]

FISH, *Washington*:

Fatal tumult at Salonica. French and German consuls slain. Great alarm here. General feeling of insecurity. Americans here and at Smyrna appeal for naval protection. Please send ship as per my dispatch sixty-three.

MAYNARD.

Received, May 12, 1876.

DEPARTMENT OF STATE,
Washington, May 12, 1876.

SIR: I have the honor to inclose, for your information and such action as you may deem proper, a copy of a telegram received to-day from Mr. Maynard, minister of the United States at Constantinople, requesting that a naval vessel be sent for the protection of Americans.

I am, sir, your obedient servant,

JOHN L. CADWALADER,
Acting Secretary.

Hon. GEORGE M. ROBESON,
Secretary of the Navy.

Inclosure.

Mr. Maynard to Mr. Fish, (telegram,) received May 12, '76.

DEPARTMENT OF STATE,
Washington, May 16, 1876.

SIR: I have the honor to inquire what action has been taken by the Navy Department on a communication from this Department, dated the 12th instant, transmitting copy of a telegram from Mr. Maynard, minister of the United States at Constantinople, requesting that a naval vessel be sent for the protection of Americans.

In replying to Mr. Maynard's dispatch the Department desires to inform him what has been done in regard to his request for the vessel.

I am, sir, your obedient servant,

HAMILTON FISH.

Hon. GEORGE M. ROBESON,
Secretary of the Navy.

NAVY DEPARTMENT,
Washington, May 20, 1876.

SIR: In reply to your letter of the 16th instant, inquiring what action has been taken by the Navy Department on a communication from the Department of State of the 12th instant, transmitting a copy of a request from Mr. Maynard, minister of the United States at Constantinople, that a naval vessel be sent for the protection of Americans, I have the honor to inclose you a copy of a telegraphic dispatch received by this Department from Rear-Admiral J. L. Worden, U. S. N., commanding the United States naval force on the European station.

Very respectfully, your obedient servant,

GEO. M. ROBESON,
Secretary of the Navy.

Hon. HAMILTON FISH,
Secretary of State.

[Cable.]

MAY 15, 1876.

ROBESON, *Navy Department, Washington, D. C. :*

Sail for Salonica sixteenth. Affairs in Turkey alarming; minister urges haste. Increasing force suggested. Alaska not yet at Madeira.

WORDEN.

No. 58.]

DEPARTMENT OF STATE,
Washington, May 20, 1876.

SIR: I have to acknowledge the receipt, on the 12th instant, of your telegram, requesting that a naval vessel be sent for the protection of Americans at Constantinople and Smyrna. A copy of the telegram was transmitted immediately to the Secretary of the Navy, who sent orders by telegraph to Admiral Worden in accordance with your request. A reply has been received from Admiral Worden that he will sail immediately from Nice for Constantinople with his flag-ship, the Franklin.

A copy of your telegram as received is inclosed herewith.

I am, sir, your obedient servant,

HAMILTON FISH.

HORACE MAYNARD, Esq., &c., &c., &c.

Inclosure.

Mr. Maynard to Mr. Fish, telegram received May 12, 1876.

ENGINEER CORPS OF THE ARMY.

LETTER

FROM

THE SECRETARY OF WAR,

IN RESPONSE TO

A resolution of the House of Representatives concerning the Engineer Corps, where stationed, the character of the public works upon which they are engaged, &c.

JUNE 2, 1876.—Referred to the Committee on Appropriations and ordered to be printed

WAR DEPARTMENT, June 2, 1876.

The Secretary of War has the honor to transmit to the House of Representatives report of the Chief of Engineers and accompanying statement, marked A, giving the information called for by House resolution of April 27, 1876, as to the present force of the Engineer Corps, where stationed, character of the public works upon which they are engaged, &c.

J. D. CAMERON,
Secretary of War.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., June 2, 1876.

SIR: In reply to the resolution of the House of Representatives of April 27, 1876, as follows:

FORTY-FOURTH CONGRESS, FIRST SESSION.

CONGRESS OF THE UNITED STATES.

IN THE HOUSE OF REPRESENTATIVES, April 27, 1876.

On motion of Mr. Cox,

Resolved, That the Secretary of War be directed to report the present force of the United States Engineer Corps; the number of officers of said corps on active duty, and where stationed; the general character of the public works upon which they are employed, and whether any, and what, officers of said corps have been or now are engaged, with or without the approbation of the Department, in the performance of any duties upon any Governmental, State, territorial, municipal, corporate, or private work, similar to those which the civil engineers of this country perform; and also the number of persons that are employed, and from civil life, as engineers and otherwise

in the engineer service of the United States under the War Department, in connection with the public works and surveys of the United States, and the salaries paid to each.

Attest:

GEO. M. ADAMS, *Clerk*.

To the honorable SECRETARY OF WAR.

I have the honor to report, that upon the 27th of April, 1876,

I. "The present force of the United States Engineer Corps" consisted of one hundred and seven commissioned officers and a battalion of sappers, miners, and pontoniers, containing two hundred and fifty-two enlisted men.

II. That upon the same date, "The number of officers of said corps on active duty" was one hundred and four; two officers being off duty, sick, and one temporarily awaiting orders after a change of station; and that the stations of the officers and the particular duties with which they were charged and upon which they were engaged are set forth in the following statement:

Statement showing rank, duties, and address of officers of the Corps of Engineers, United States Army, April 27, 1876.

Rank.	Names.	Duties and address.
Brig. Gen.	Andrew A. Humphreys	Commanding Corps of Engineers. Member of commission to examine into canal-routes across the isthmus connecting North and South America. Office of the Chief of Engineers, Washington, D. C.
Colonel	John G. Barnard	Member of board of engineers for fortifications. Member of Light-House Board. Army Building, Houston and Greene streets, New York City.
Colonel	Henry W. Benham	In charge of construction of Forts Winthrop, Independence, and Warren, and work on Long Island Head. Box 209 Boston, Mass.
Colonel	John N. Macomb	In charge of improvement of the Upper Mississippi and Illinois Rivers, and Des Moines and Rock Island Rapids of the Mississippi River. The survey for the improvement of that portion of the Mississippi route designated by the Senate Select Committee on Transportation Routes to Seaboard, as improvements upon a system to be provided so as to give from four and a half to six feet depth of water at lowest stages from Falls of Saint Anthony to Alton. Rock Island, Ill.
Colonel	James H. Simpson	In charge of improvement of Osage River and Mississippi River, between the mouths of the Illinois and Missouri Rivers, and between the mouths of the Missouri and Ohio Rivers. 417 Pine street, Saint Louis, Mo.
Colonel	Israel C. Woodruff	On detached service. Engineer third light-house district. Post-office box 4032, New York City.
Colonel	Zealous B. Tower	Member of board of engineers for fortifications. Army Building, Houston and Greene streets, New York City.
Lt.-Colonel.	Horatio G. Wright	Member of board of engineers for fortifications. Army Building, Houston and Greene streets, New York City.
Lt.-Colonel	John Newton	In charge of construction of Forts Montgomery, Columbus, Castle William, South Battery, Governor's Island; Wood, Hamilton, and additional batteries; Mortar Battery at Fort Hamilton, and fort at Sandy Hook; manufacture and supply of mastic; improvement of the Hudson River and East Chester Creek, N. Y. Otter Creek, Vt., and Passaic River, N. J.; removal of obstructions in the East and Harlem Rivers, including Hell Gate, N. Y.; harbor improvements at Burlington and Swanton, Vt., Rondout, Port Chester, and Plattsburgh, N. Y.; examination and survey of Port Henry, Lake Champlain; the survey of so much of the third subdivision of the northern route, designated by the Senate Select Committee on Transportation Routes to Seaboard, as extends from Troy, on the Hudson River, to New York City. Army Building, Houston and Greene streets, New York City.
Lt. Colonel.	George Thom	In charge of works for improvement of rivers Saint Croix, Machias, Penobscot, Keunebec, Cocheco, New Hampshire, and Merrimac, Massachusetts; of harbors of Camden, Portland, Richmond's Island, Maine; Gloucester, Salem, Boston, Hingham, Plymouth, and Provincetown, Massachusetts; construction of sea-walls of Great Brewster, Deer and Lovell's Islands, Boston Harbor. Portland, Me.
Lt. Colonel.	John D. Kurtz	In charge of construction of Forts Delaware, Delaware, and Mifflin, Pennsylvania, battery at Finn's Point, New Jersey, and work opposite Fort Delaware; piers at Newcastle and Lewes, Delaware; harbor improvements at Wilmington, Del., and on Delaware River and Bay; improvement of Cohanssey Creek, New Jersey, Delaware and Broadkill Rivers, Delaware and Schuylkill Rivers, Pennsylvania. 1328 Chestnut street, Philadelphia, Pa.

Statement showing rank, duties, and address of officers, &c.—Continued.

Rank.	Names.	Duties and address.
Lt. Colonel	Barton S. Alexander...	Senior engineer charged with general supervision and inspection of all matters under the command of the Chief of Engineers within the Pacific territory. Member of board of engineers for fortifications on the Pacific coast. San Francisco, Cal.
Lt. Colonel	William F. Reynolds...	On detached service. Engineer fourth light-house district. 532 Walnut street, Philadelphia, Pa.
Lt. Colonel	Charles S. Stewart....	In charge of construction of fortifications at Fort Point, Point San José and Angel Island, San Francisco, and at San Diego, Cal., and improvement of San Diego Harbor. Member of board of engineers for fortifications on the Pacific coast. San Francisco, Cal.
Lt. Colonel	Charles E. Blunt.....	In charge of improvement of harbors of Fort Clinton, Monroe, Toledo, Sandusky City, Huron, Vermillion, Black River, Rocky River, Cleveland, Grand River, Ashtabula, Conneaut, Erie, Dunkirk, and Buffalo, on Lake Erie; and construction of Fort Porter, New York, and of Fort Wayne, Michigan. Engineer tenth light-house district. Buffalo, N. Y.
Lt. Colonel	James C. Duane	In charge of construction of Forts Gorges, Preble, Scammel, Popham, Knox, and battery at Portland Head, Maine, and Forts Constitution and McClary, and batteries on Jerry's Point and Gerriah's Island, Portsmouth Harbor, New Hampshire. Engineer first and second light-house districts. Portland, Me.
Lt. Colonel	Robert S. Williamson.	On detached service. Engineer twelfth light-house district. Member board of engineers for fortifications on the Pacific coast. San Francisco, Cal.
Lt. Colonel	Quincy A. Gillmore...	In charge of construction of Forts Wadsworth, Tompkins and its batteries, New York; Macon and Caswell, North Carolina; Moultrie, Sumter, Johnson, and Castle Pinckney, South Carolina; Jackson and Pulaaki, Georgia; Clinch and Marion, Florida; and temporary charge of Forts Monroe and Wool, Virginia. Improvement of Charleston Harbor, South Carolina, Savannah River and Harbor. Member of board to test the strength and value of all kinds of iron, steel, and other metals submitted to it. P. O. Box 1647, New York City.
Lt. Colonel	Thos. Lincoln Casey..	In charge of the first and second divisions. Member of board for investigation and action concerning the ventilation of Hall of House of Representatives. Office of the Chief of Engineers, Washington, D. C.
Major.....	Nathaniel Michler....	Awaiting orders. 1328 Chestnut street, Philadelphia, Pa.
Major.....	John G. Parke	In charge of the third division. Office of the Chief of Engineers, Washington, D. C.
Major.....	Gouverneur K. Warren	In charge of construction of defenses of New Bedford Harbor, Mass., Narragansett Bay, R. I., improvement of harbors of Wareham, Hyannis, and Fall River, Mass., Wickford and Newport, R. I.; improvement of rivers Taunton, Mass., Pawtucket and Providence, R. I., Pawcatuck, R. I. and Conn., and Connecticut, Conn. Construction of breakwater at Block Island, R. I. Newport, R. I.
Major.....	George H. Mendell....	In charge of construction of fort on Alcatraz Island, and of defenses at Lime Point, San Francisco Bay, breakwater at Wilmington Harbor, California; removal of Rincon Rock in the harbor of San Francisco, and improvement of Oakland Harbor, and Sacramento and Feather Rivers, California. Member of board of engineers for fortifications on the Pacific coast. Member of advisory board of commissioners on the harbor-lines of San Francisco. San Francisco, Cal.
Major.....	Henry L. Abbot	Commanding engineer depot and post of Willet's Point and Battalion of Engineers. In charge of construction of Fort Schuyler and fort at Willet's Point, N. Y., and of experiments with torpedoes. Whitestone, Queens County, N. Y.
Major.....	William P. Craighill..	In charge of construction of defenses of Baltimore, Md., and Washington, D. C., improvement of Susquehanna, Patapsco, Chester, Wicomico, and Elk Rivers, Maryland; James and Appomattox Rivers, Virginia; Great Kanawha River, West Virginia; and Cape Fear River, North Carolina; of the harbors of Baltimore and Crisfield, Md. The survey of that portion of the central route designated by the Senate Select Committee on Transportation-Routes to the Seaboard as "a connection by canal or freight-railway from the Ohio River or Kanawha River, near Charleston, by the shortest and most practicable route through West Virginia to tide-water in Virginia;" and "the improvement of the Kanawha River from its mouth to Great Falls, so as to give six feet navigation at all seasons." Union Bank Building, Baltimore, Md.
Major.....	Cyrus B. Comstock....	In charge of survey of northern and northwestern lakes. Detailed to report upon the depth and width of a channel secured and maintained by jetties constructed by James B. Eads at mouth of Mississippi River. Detroit, Mich.

Statement showing rank, duties, and address of officers, &c.—Continued.

Rank.	Names.	Duties and address.
Major.....	Godfrey Weitzel.....	In charge of improvement of the falls of the Ohio River and Louisville and Portland Canal; of Saint Mary's Falls Canal and Saint Mary's River, and Saint Clair Flats Canal; Saint Clair, Sebawing, and Saginaw Rivers, Michigan; of harbors Cheboygan, Au Sable River, and Harbor of Refuge on Lake Huron, and removal of obstructions from Detroit River. Survey of the National Park on the island of Mackinaw. Engineer eleventh light-house district. Detroit, Mich.
Major.....	Orlando M. Poe.....	On detached service. Aid-de-camp on the personal staff of the General of the Army, with the rank of colonel. Member of Light-House Board. Washington, D. C.
Major.....	David C. Honston.....	In charge of harbor improvements at Milwaukee, Racine, and Kenosha; improvement of the Fox and Wisconsin Rivers. Milwaukee, Wis.
Major.....	George H. Elliot.....	In charge of the 4th and 5th divisions. Office of the Chief of Engineers, Washington, D. C.
Major.....	Henry M. Robert.....	In charge of harbor improvements at Ontonagon, Eagle Harbor, Marquette, Menomonee, Green Bay, Ahnapee, Two Rivers, Manitowoc, Sheboygan, Port Washington, and Harbor of Refuge at entrance of Sturgeon Bay Canal. Milwaukee, Wis.
Major.....	William E. Merrill.....	In charge of improvement of the Ohio, Monongahela, and Wabash Rivers. Engineer in fourteenth light-house district. No. 82 West Third street, Cincinnati, Ohio.
Major.....	Walter McFarland.....	In charge of construction of Forts Ontario and Niagara, N. Y.; of harbor improvements at Olcott, Oak Orchard, Charlotte, Putneyville, Bigodus, Littleodus, Oswego, Black River, Ogdensburg, Wilson, and Waddington, N. Y. In charge of improvement of the Tennessee River; Cumberland River, below Nashville, Tenn.; Tombigbee River, in Mississippi; and Oostenaula and Coosawattee Rivers, Georgia. On duty under United States Isthmus Canal Commission in connection with the examination of proposed routes for canal between the Atlantic and Pacific Oceans. In charge of the survey designated by the Senate Select Committee on Transportation Routes to the Seaboard as the "Southern route," viz: 1st, for the improvement of the Tennessee River from its mouth to Knoxville, so as to give 3 feet depth at lowest stages of water; and 2d, a communication by canal or freight-railway, from some convenient point on the Tennessee River in Alabama or Tennessee, by the shortest and most practicable route to the Atlantic Ocean. Chattanooga, Tenn.
Major.....	Orville E. Babcock.....	In charge of Public Buildings and Grounds and certain public works in the District of Columbia, with the rank of Colonel of Engineers; of work on the east wing of the building for the State, War, and Navy Departments; of Washington Aqueduct and Chain Bridge on the Potomac River, and construction of Anacostia Bridge over the Eastern Branch. Washington, D. C.
Major.....	John M. Wilson.....	In charge of works for defense of the mouth of the Columbia River, and improvement of the Upper Willamette, Umpqua, and the Upper Columbia Rivers, Lower Willamette and Columbia Rivers, Oregon. Demarkation and survey of military reservations on San Juan and adjacent islands in Puget Sound. Examinations and surveys at mouth of Nehalem River, and Alsea River and bar, Oregon. Engineer thirteenth light-house district. Portland, Oregon.
Major.....	Franklin Harwood.....	On detached service. Engineer fifth light-house district. No. 1 Courtland street, Baltimore, Md.
Major.....	John W. Barlow.....	In charge of Forts Griswold and Hale, and the construction of Fort Trumbull, Conn.; improvement of harbors of Stonington, New Haven, Bridgeport, Milford, Westport, Southport, and Norwalk, Conn.; Port Jefferson, N. Y.; improvement of rivers Housatonic, Conn., and Peconic, N. Y. New London, Conn.
Major.....	Peter C. Hains.....	On detached service. Engineer secretary to Light-House Board. Washington, D. C.
Major.....	Francis U. Farquhar.....	In charge of harbor improvements at Superior City, Superior Bay, and Duluth; improvement of Falls of Saint Anthony, and of the Mississippi River above the Falls of Saint Anthony; improvements and surveys on Minnesota River; construction of Meeker's Island lock and dam. In charge of the survey of that portion of the "Mississippi route" designated by the Senate Select Committee on Transportation Routes to the Seaboard as that for the construction of reservoirs at the sources of the river, and that for securing from 3 to 5 feet depth of water at lowest stage above the Falls of Saint Anthony. Saint Paul, Minn.
Major.....	George L. Gillespie.....	Engineer officer military division of the Missouri. In charge of the construction of the harbors of Chicago, Calumet, Michigan City, and New Buffalo. Chicago, Ill.

Statement showing rank, duties, and address of officers, &c.—Continued.

Rank.	Names.	Duties and address.
Major.....	Charles R. Suter.....	In charge of improvement of the Mississippi, Missouri, Arkansas, White, and Saint Francis Rivers. The examination of that portion of the "Mississippi route" designated by the Senate Select Committee on Transportation-Routes to the Seaboard as that which relates to the plan and probable cost of securing a depth of from 8 to 10 feet at lowest stage of water between Cairo and New Orleans. Engineer 14th and 15th light-house districts. No. 216 North Eighth street, Saint Louis, Mo.
Major.....	Jared A. Smith.....	In charge of construction of Forts Jefferson and Taylor, Florida. Engineer 7th light-house district. Key West, Fla.
Major.....	Samuel M. Mansfield..	In charge of harbor improvements at Frankfort, Manistee, Ludington, Pentwater, White River, Muskegon, Grand Haven, Black Lake, Saugatuck, South Haven, and Saint Joseph, on Lake Michigan. Detroit, Mich.
Captain....	W. J. Twining.....	On detached service under the Department of State, upon the joint commission for the survey of the boundary-line along the 49th parallel. 1930 Pennsylvania avenue, Washington, D. C.
Captain....	William R. King.....	Commanding Company B, Battalion of Engineers. Whitestone, Queens County, N. Y.
Captain....	Wm. H. H. Benyard..	In charge of improvement of the Ouachita River in Louisiana and Arkansas, and of the Yazoo River in Mississippi, and Cypress Bayou, Texas; of water-gauges on the Mississippi River and its principal tributaries; removal of raft in Red River, Louisiana; dredging at foot of Sodo Lake, Texas. Memphis, Tenn.
Captain....	Charles W. Howell....	In charge of construction of Forts Pike, Macomb, Tower Dnpräs, Battery Bienvenue, tower at Proctorville, Jackson, Saint Philip, and Livingston. Improvement of the mouth of the Mississippi River, Galveston Harbor, Sabine Pass, and Red Fish Bar in Galveston Bay, and ship-channel San Jacinto River to Bolivar Channel, Galveston Bay, Texas. Drawer 432, New Orleans, La.
Captain....	Garret J. Lydecker...	On duty under immediate orders of Major Houston. 472 Jefferson street, Milwaukee, Wis.
Captain....	Arthur H. Burnham...	On sick leave. 31 Tyler street, Lowell, Mass.
Captain....	Amos Stickney.....	On duty under immediate orders of Colonel Macomb. Keokuk, Iowa.
Captain....	James W. Cuyler.....	On sick leave. Brown, Shipley & Co., London, England.
Captain....	Alexander Mackenzie..	On duty under immediate orders of Major Weitzel. Louisville, Ky.
Captain....	Oswald H. Ernst.....	Commanding Company E, Battalion of Engineers. On duty at the Military Academy. Instructor of practical military engineering, military signals, and telegraphy. West Point, N. Y.
Captain....	David P. Heap.....	On duty under Board of United States Executive Departments, collecting and arranging articles pertaining to Engineer Department for the International Exhibition of 1876. Room 5, 230 South Third street, Philadelphia, Pa.
Captain....	William Ludlow.....	On detached service. Engineer officer Department of Dakota. Post-office box 11, Saint Paul, Minn.
Captain....	Charles B. Phillips....	On duty under immediate orders of Major Craigbill. Union Bank Building, Baltimore, Md.
Captain....	William A. Jones.....	On detached service. Engineer 6th light-house district. Charleston, S. C.
Captain....	Andrew N. Damrell...	In charge of construction of defenses of Mobile and Pensacola, and fort on Ship Island, Miss.; improvement of harbor of Mobile; of Chattahoochie and Flint Rivers, Georgia; Apalachicola River, Florida; and Warrior and Tombigbee Rivers, Alabama; removal of obstructions in the Choctawhatchie River, Alabama and Florida; dredging the bar at mouth of harbor at Cedar Keys, Fla. Engineer 5th light-house district. Mobile, Ala.
Captain....	Charles J. Allen.....	On duty under immediate orders of Colonel Simpson. 417 Pine street, Saint Louis, Mo.
Captain....	Charles W. Raymond..	On detached service. On duty at the Military Academy. West Point, N. Y.
Captain....	Lewis C. Overman....	On duty under immediate orders of Major McFarland. Nashville, Tenn.
Captain....	Alexander M. Miller...	On detached service. On duty at the Military Academy. West Point, N. Y.
Captain....	Micah R. Brown.....	On duty under immediate orders of Major Comstock, upon improvement of the South Pass of the Mississippi River. Post-office drawer 432, New Orleans, La.
Captain....	Milton B. Adams.....	On duty under immediate orders of Lieutenant-Colonel Blunt. Cleveland, Ohio.
Captain....	William R. Livermore..	Commanding Company C, Battalion of Engineers. Whitestone, Queens County, N. Y.
Captain....	William H. Heuer.....	On duty under immediate orders of Lieutenant-Colonel Newton. Astoria, N. Y.
Captain....	William S. Stanton....	On detached service, engineer officer Department of the Platte. Post-office box 544, Omaha, Nebr.
Captain....	A. Nisbet Lee.....	On duty under immediate orders of Major Weitzel. Detroit, Mich.
Captain....	Thomas H. Handbury..	On detached service. On duty at the Military Academy. West Point, N. Y.

Statement showing rank, duties, and address of officers, &c.—Continued.

Rank.	Names.	Duties and address.
Captain....	James C. Post.....	On duty under immediate orders of Lieutenant-Colonel Gillmore. Post-office box 43, Charleston, S. C.
Captain....	James F. Gregory.....	On detached service under the Department of State upon the joint commission for the survey of the boundary-line along the 49th parallel. 1830 Pennsylvania avenue, Washington, D. C.
Captain....	Henry M. Adams.....	On duty under immediate orders of Major Comstock. Detroit, Mich.
Captain....	James Mercur.....	In temporary command of Company A, Battalion of Engineers. Whitestone, Queens County, N. Y.
First lieutenant.	Chas. E. L. B. Davis...	On duty under immediate orders of Captain Howell. To assist Major Comstock in the performance of special duty relative to the jetty-system at the mouth of the Mississippi River. Lock-drawer 432, New Orleans, La.
First lieutenant.	Benjamin D. Greene..	Q. M. Battalion of Engineers. A. A. Q. M. & A. C. S., and recruiting officer post of Willet's Point. Whitestone, Queens County, N. Y.
First lieutenant.	John H. Weeden.....	On duty under immediate orders of Lieutenant-Colonel Stewart. Post-office box 1358, San Francisco, Cal.
First lieutenant.	George M. Wheeler...	In charge of geographical explorations and surveys west of the 100th meridian. Post-office box 93, Washington, D. C.
First lieutenant.	James B. Quinn.....	On duty under immediate orders of Captain Howell. Post-office box 900, Galveston, Tex.
First lieutenant.	Daniel W. Lockwood...	On duty under immediate orders of Major Comstock. Detroit, Mich.
First lieutenant.	Ernest Ruffner.....	On detached service. Engineer officer, Department of the Missouri. Fort Leavenworth, Kans.
First lieutenant.	John C. Mallory.....	On detached service. Engineer officer, military division of the Pacific. San Francisco, Cal.
First lieutenant.	Clinton B. Sears.....	On duty under immediate orders of Colonel Benham. 13 Exchange Place, Boston, Mass.
First lieutenant.	Thomas Turtle.....	On duty under immediate orders of Major Craigbill. Union Bank building, Baltimore, Md.
First lieutenant.	Edward Maguire.....	Do.
First lieutenant.	Frederick A. Mahan..	On duty under immediate orders of Major Merrill. No. 82 West Third street, Cincinnati, Ohio.
First lieutenant.	Charles F. Powell.....	On duty under immediate orders of Major Comstock. Detroit, Mich.
First lieutenant.	Frederick A. Hinman..	On duty under immediate orders of Major Houston. 472 Jefferson street, Milwaukee, Wis.
First lieutenant.	Albert H. Payson.....	On duty at the Military Academy, and with Company E, Battalion of Engineers. West Point, N. Y.
First lieutenant.	John G. D. Knight....	On detached service. On duty at the Military Academy. West Point, N. Y.
First lieutenant.	Richard L. Hoxie.....	On detached service. Chief engineer of the District of Columbia, under the direction of the Board of Commissioners. Columbia Building, Fourth-and-a-half street, Washington, D. C.
First lieutenant.	Edgar W. Bass.....	Adjutant Battalion of Engineers and post of Willet's Point. Post treasurer and signal-officer. Whitestone, Queens County, N. Y.
First lieutenant.	William L. Marshall..	On duty under immediate orders of Lieutenant Wheeler. Post-office lock-box 93, Washington, D. C.
First lieutenant.	Joseph H. Willard....	On duty under immediate orders of Lieutenant-Colonel Newton. Box 228, Albany, N. Y.
First lieutenant.	Eric Bergland.....	On duty under immediate orders of Lieutenant Wheeler. Los Angeles, Cal.
First lieutenant.	Samuel E. Tillman....	On detached service. On duty at Military Academy. West Point, N. Y.
First lieutenant.	Philip M. Price.....	On duty under immediate orders of Major Comstock. Detroit, Mich.
First lieutenant.	Francis V. Greene....	On detached service under the Department of State upon the joint commission for the survey of the boundary-line along the 49th parallel. 1830 Pennsylvania avenue, Washington, D. C.
First lieutenant.	Carl F. Palfrey.....	On detached service. On duty at the Military Academy. West Point, N. Y.
First lieutenant.	William H. Bixby.....	Do.
Second lieutenant.	Henry S. Taber.....	On duty with Company B, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	William T. Rossell....	On duty with Company A, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	Thomas N. Bailey.....	On duty under immediate orders of Major Comstock, Detroit, Mich.
Second lieutenant.	Thomas W. Symons....	On duty with Company C, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	Smith S. Leach.....	On duty with Company B, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	Dan. C. Kingman'.....	On duty with Company C, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	Eugene Griffin.....	On duty with Company B, Battalion of Engineers, Whitestone, Queens County, N. Y.
Second lieutenant.	Willard Young.....	On duty with Company A, Battalion of Engineers, Whitestone, Queens County, N. Y.

TABULATED STATEMENT OF THE ABOVE.

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On fortifications and light-house duty.....	3
On fortifications and river and harbor works.....	21
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On river and harbor works.....	13
On river and harbor works and light-house duty.....	5
On light-house duty.....	6
On public buildings and grounds.....	1
On duty with Battalion of Engineers.....	15
On survey of northern and northwestern lakes.....	6
On duty at Military Academy instructing cadets.....	7
On duty under board United States Executive Departments, Centennial Exhibition.....	1
On explorations west of one hundredth meridian.....	3
On survey of northern boundary under Department of State.....	3
On sick-leave.....	2
Awaiting orders.....	1
Detached: On duty with the General of the Army, generals commanding departments and divisions, and board of Commissioners of the District of Columbia.....	7

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III. That "the general character of the public works upon which the officers of the Corps of Engineers are employed" is as follows:

a. The surveys for and the projecting, planning, and draughting of the plans for the construction or modification of the fortifications of the country, and the actual superintendence of their erection, including the hiring of workmen and purchase of materials.

b. The surveys for, and the projecting, planning, and draughting of the plans for the improvements in navigation of such rivers, harbors, bays, or roadsteads as Congress may direct from time to time to be executed, the actual superintendence of the construction of the same, either by contract or by the hiring of workmen and purchase of materials.

c. As resident engineers of light-house districts, the planning, superintendence of erection, either by contract or days' labor, of all fixed aids to navigation in the shape of light-houses and lighting-apparatus, beacons, spindles, &c., under the direction of the Light-House Board, of which board three officers of the Corps of Engineers are members.

d. The careful geodetic survey of the northern and northwestern lakes, and the projection and publication of the charts used in the navigation of the same.

e. The officering the Battalion of Engineers and the instruction of the same in sapping, mining, pontoniering, field-reconnoissance, and the loading, planting, and firing of electrical torpedoes for the obstruction of the channels and fairways leading into harbors, and the instruction of cadets in the same.

f. Explorations, reconnaissances, and surveys in the western Territories in the interest of easy communication through, and military operations in, the several military departments, or of the development and opening up of the country for settlement, and commercial or mining enterprises.

g. Any other duties which may be assigned by the order of the President, or acts of Congress, as engineer of the District of Columbia, Commissioner of Public Buildings and Grounds, surveys for the establishment of boundary-lines, international or other, instructors of cadets at the Military Academy, engineer officers upon the staffs of command

ing generals, members of commissions, boards, &c., for the discussion of questions connected with the bridging of western rivers, the projection of lines of communication in the interests of commerce, navigation, &c., &c.

IV. In reply to the inquiry "whether any and what officers of said corps have been or now are engaged, with or without the approbation of the Department, in the performance of any duties upon any governmental, State, territorial, municipal, corporate, or private work similar to those which the civil engineers of this country perform," a statement marked "A" is annexed, containing answers, so far as received from the officers of the Corps of Engineers, to this inquiry, and covering a period of five years, from April 27, 1871, to April 27, 1876. In none of these cases have any of the officers been engaged in any sense as a custom in the performance of duties peculiar to the civil engineers of the country. The officers of the Corps of Engineers are all educated at the Military Academy, are taught military and civil engineering, and are capable of solving such problems in either branch of engineering as the Government may require to be solved; but the great divisions of the duties of the Corps of Engineers are not such as corporate companies or rich capitalists employ the civil engineers of the country upon, and cannot be, so long as the navigable waters, the lighting of the coasts, and the charge of the public lands are under the control of the General Government.

V. "The number of persons that are employed, and from civil life, as engineers and otherwise, in the engineer service of the United States under the War Department in connection with the public works and surveys of the United States, and the salaries paid to each," are as follows:

Occupation.	Number.	Rate of pay.		
		Lowest.	Highest.	
Assistant engineers	134	\$75 00	\$350 00	Per month.
Topographers	2	100 00	200 00	Do.
Geologists	4	80 00	360 00	Do.
Mineralogists	1	112 50	112 50	Do.
Zoologists	1	125 00	125 00	Do.
Ethnologists	1	175 00	175 00	Do.
Physicians	1	40 00	40 00	Do.
Inspectors	51	50 00	165 00	Do.
Draughtsmen	68	50 00	200 00	Do.
Clerks	91	60 00	250 00	Do.
Recorders	2	2 50	3 33	Per day.
Overseers	37	75 00	200 00	Per month.
Captains of steamers	19	60 00	200 00	Do.
Mates of steamers	5	1 50	4 16	Per day.
Steam-engineers	34	2 00	6 66	Do.
Pilots	5	1 66	5 00	Do.
Other boatmen	119	2 50	5 00	Do.
Horses, carts, and teams	68	2 25	3 60	Do.
Divers	4	2 00	5 00	Do.
Other employés	1,725	33	6 00	Do.
	2,372			

The physical ability of a corps of officers of fixed numbers to perform work is necessarily limited. When the amount of work imposed upon them requires physical labor in excess of that limit, assistance must necessarily be had. As the requirement for this assistance in the Engineer Department varies constantly and largely, the number of assistant engineers, draughtsmen, clerks, and other employés of the Depart-

ment varies accordingly. The necessity for the employment of assistance has always existed. If there were a sufficient number of officers to do all the engineering and clerical, field, and office work, no civilians would be employed, and only a sufficient number are engaged to execute, with the officers of the corps, the work which is required by acts of Congress, as contained in the several appropriation bills.

The above numbers do not include the workmen employed and paid by contractors or any of the employes upon the light-house establishment.

Very respectfully, your obedient servant,

A. A. HUMPHREYS,
Brig. Gen., Chief of Engineers.

The Hon. SECRETARY OF WAR.

A.

Statement showing "whether any and what officers of said corps (Corps of Engineers) have been or now are engaged, with or without the approbation of the Department, in the performance of any duties upon any Governmental, State, territorial, municipal, corporate, or private work, similar to those which the civil engineers of this country perform."

NOTE.—The time covered in this answer is from April 27, 1871, to April 27, 1876, and the duties the officers have been engaged upon other than those assigned to them by order of the Secretary of War, under acts of Congress, as officers of the Corps of Engineers, are as follows:

Rank.	Name of officer.	Report of officer.
Brig. Gen..	A. A. Humphreys.....	Member of advisory board to harbor commissioners of Massachusetts, with sanction of Secretary of War. Advised board of public works, District of Columbia, as to best kind of concrete-pavement, and best method of preserving wood used for paving. Member of board to determine the bulk-head and pier-head lines of Brooklyn, and of board to determine the same on Staten Island; by order of the President. Member of board to prepare plan for improving harbors of Washington and Georgetown; act of Congress. Member of commission to examine into ship-canal routes across the isthmus connecting North and South America; appointment of the President. Member of commission for sale of Philadelphia navy-yard; act of Congress.
Colonel	John G. Barnard.....	Examined the principal artificial water-ways in Europe, on behalf of the Tehuantepec Railway and Canal Company, in reference to proposed interoceanic ship-canal through Isthmus of Tehuantepec; also investigated use of iron in sea-coast defenses; permission of Secretary of War. Member of advisory commission of engineers, to consider the plans in execution by James B. Eads, for constructing jetties at mouth of the Mississippi River; sanction of the President. Consulting engineer in matter of building bridge over East River across Blackwell's Island.
Colonel	Henry W. Benham.....	Not any.
Colonel	John N. Macomb.....	Not any.
Colonel	James H. Simpson.....	Not any.
Colonel	I. C. Woodruff.....	Not any.
Colonel	Z. B. Tower.....	Not any.
Lieut. Col..	H. G. Wright.....	Not any.
Lieut. Col..	John Newton.....	Member of board to determine the bulk-head and pier-lines of Brooklyn, and of board to determine the same on Staten Island; by order of the President. Acted as advisory engineer upon the improvement of the harbor of Montreal; approval of the Secretary of War. Acted as advisory engineer to report upon the bulk-head walls of New York City. Examined and reported upon the Peekskill projected bridge. Has examined plans of structures by private parties.
Lieut. Col..	George Thom.....	Not any.
Lieut. Col..	John D. Kurtz.....	Not any.
Lieut. Col..	Barton S. Alexander ..	Has given opinions upon private, corporate, and municipal works. Has no memoranda of the transactions. Member of advisory commission of engineers to consider the plans in execution by James B. Eads for constructing jetties at mouth of the Mississippi River; sanction of the President.
Lieut. Col..	William F. Reynolds ..	Not any.
Lieut. Col..	Charles S. Stewart ..	Do.
Lieut. Col..	Charles E. Blunt.....	Do.
Lieut. Col..	James C. Duane.....	Do.
Lieut. Col..	R. S. Williamson.....	Do.

Rank.	Name of officer.	Report of officer.
Lt. Colonel.	Q. A. Gillmore	Has occasionally been called into consultation by civil engineers and municipal, corporate, and private parties upon works in progress and contemplation, and has given professional advice relating thereto. Gave verbal opinion on method adopted for drainage of Jersey flats, between Hackensack and Passaic Rivers. Gave opinion on method of repairing Newton Creek pivot bridge. Gave opinion on plan of a bridge across the Hudson River at Peekskill. Is engaged with two other engineers in selecting plan for a bridge across the East River at Blackwell's Island. Examined and gave opinion on the dock-walls of New York City. Has given information on subject of pavements, devices for laying concrete and other masonry under water; quality of bricks, cement, stone, &c.
Lt. Colonel.	Thomas Lincoln Casey	At request of Committee on Public Buildings and Grounds, is member of board for investigation and action concerning the ventilation of Hall of House of Representatives, by permission of the Secretary of War.
Major.....	Nathaniel Michler.....	Not any.
Major.....	John G. Parke	Do.
Major.....	G. K. Warren	Assisted in establishing the harbor-lines of Bridgeport, Conn., in 1872. Sanctioned by the Secretary of War.
Major.....	George H. Mendell.....	Member of advisory board of commissioners for the determination and location of a harbor-line for the proper modeling of the harbor of San Francisco. Appointed by the Secretary of War. Has had charge of several tidal stations on the Pacific coast, under the direction of the Superintendent of the United States Coast Survey. At the request of the city hall commissioners of San Francisco, made reports to them on two occasions on points and amounts of construction on the new city hall. Has made several reports on special points of engineering to private parties; has no record of these.
Major.....	Henry L. Abbot	Not any.
Major.....	William P. Craigbill ..	In 1871, at the request of a commission appointed by the mayor and council of Baltimore, gave opinion as to proper plan for improvement of the stream known as "Jones's Falls," passing through the city. In 1874, at the request of the city of Baltimore, supervised the improvement of the ship-channel leading from the bay to that city.
Major.....	Cyrus B. Comstock.....	Contributed articles to Johnson's Cyclopedia.
Major.....	Godfrey Weitzel	In 1874, at urgent request of the city authorities of Detroit, acted as member of a commission for selecting a site for the new city water-works.
Major.....	Orlando M. Poe.....	Since 1873 has been aide-de-camp to the General of the Army of the United States; by his order. In summer of 1873, acted as engineer secretary to the Light House Board, permission of the General of the Army. In 1874, in reply to a request from the engineer of the Detroit water-works, gave his views concerning certain questions with reference to location of Detroit water-works.
Major.....	David C. Houston	Not any.
Major.....	George H. Elliot.....	Not any.
Major.....	Henry M. Robert	Not any.
Major.....	William E. Merrill.....	In 1873, at the request of the water-commissioners of Covington, Ky., examined reservoir at water works building, and recommended plan for making it water-tight. In 1874 calculated for private parties the discharge of a proposed mill-race of given size with varying depths of water. Also, examined for a citizen of Covington the grades of the streets recently opened around his house to show that he had been unnecessarily damaged by defective grades. Was appointed by the district court of Hamilton County, Ohio, special master to see that the tail-race of the Miami Machine Works was constructed in accordance with decree of the court. In 1875 was requested by the mayor of Clifton (suburb of Cincinnati) to give him professional advice as to best method of preventing land-slides in clayey soils; of protecting approaches of bridge over Mill Creek, and of draining several ponds. At the instance of private parties gave opinion on plans for a projected tunnel under the Miami Canal.
Major.....	Walter McFarland.....	Examined proposed routes for canal to connect Atlantic and Pacific Oceans. Authorized by Secretary of War.
Major.....	Orville E. Babcock.....	On duty with the President, by direction of the Secretary of War. Member of board to prepare plan for improving the harbors of Washington and Georgetown. Act of Congress March 5, 1872. To designate the place at which the Baltimore and Potomac Railroad Company shall construct an iron bridge over Sixth street. Act of Congress May 21, 1872. Member of commission to procure statue of the late General John A. Rawlins. Act of Congress June 10, 1872. Examined and measured paving, curbing, grading, sewerage, and other improvements adjoining property of United States in District of Columbia. Act of Congress January 8, 1873.

Rank.	Name of officer.	Report of officer.
		Examined and measured the work done around the Government reservations by the late corporation of Washington and by the board of public works; also work done and to be done to improve streets and avenues around Government property. Act of Congress, March 3, 1873.
		Ascertained and reported the amount of work done and prices paid for improvement of avenues of Washington. Act of Congress, March 3, 1873.
		Had charge of improvement of Congressional Cemetery. Act of Congress, March 3, 1873.
		Caused the Washington and Georgetown Railroad Company and the Metropolitan Railroad Company to remove their tracks from the Capitol grounds. Act of Congress, May 8, 1872.
		To approve lateral branch and points of intersection from Baltimore and Ohio Railroad to Metropolitan branch of said railroad. Act of Congress, June 19, 1874.
		To approve route selected by the Washington City and Point Lookout Railroad Company through the City of Georgetown, D. C. Act of Congress, June 23, 1874.
		Caused the Washington and Georgetown Railroad Company to remove their track from the Washington Aqueduct bridge over Rock Creek. Act of Congress, March 3, 1875.
		Member of commission to procure pedestal for an equestrian statue of General James B. McPherson. Act of Congress, March 5, 1875.
Major.....	John M. Wilson.....	Not any.
Major.....	Franklin Harwood.....	Do.
Major.....	John W. Barlow.....	Do.
Major.....	Peter C. Hains.....	Do.
Major.....	F. U. Farquhar.....	Do.
Major.....	George L. Gillespie.....	Do.
Major.....	Charles R. Luter.....	Do.
Major.....	Jared A. Smith.....	Do.
Major.....	Samuel M. Mansfield.....	Do.
Captain....	William J. Twining.....	No report received.
Captain....	William R. King.....	Not any.
Captain....	William H. H. Ben- yard.	Do.
Captain....	Charles W. Howell.....	Made examination at mouth of Brazos River, in Texas, and reported thereon for a railroad company.
Captain....	G. J. Lydecker.....	Not any.
Captain....	A. H. Burnham.....	Do.
Captain....	Amos Stickney.....	During past year has drilled a militia company between 8 and 9 o'clock in the evening.
Captain....	James W. Cuyler.....	Absent sick. No report.
Captain....	Alexander Mackenzie.....	Not any.
Captain....	O. H. Ernst.....	Has contributed articles to Johnson's Illustrated Universal Cyclo- pedia.
Captain....	David P. Hesp.....	Not any.
Captain....	William Ludlow.....	Do.
Captain....	Charles B. Phillips.....	Member of advisory board to aid the State harbor commission of Norfolk and Portsmouth in the determination of port-warden's lines for the harbors of those cities. Appointed by Secretary of War.
Captain....	William A. Jones.....	Not any.
Captain....	Andrew N. Damrell.....	No report received.
Captain....	Charles J. Allen.....	Not any.
Captain....	Charles W. Raymond.....	Performed duty in connection with observation of the transit of Venus. Order of the Secretary of War.
Captain....	Lewis C. Overman.....	Not any.
Captain....	Alexander M. Miller.....	Do.
Captain....	Micah R. Brown.....	Do.
Captain....	Milton B. Adams.....	Do.
Captain....	William R. Livermore.....	Do.
Captain....	William H. Heuer.....	Do.
Captain....	William S. Stanton.....	Do.
Captain....	A. Nisbet Lee.....	Do.
Captain....	Thomas H. Handbury.....	Do.
Captain....	James C. Post.....	Do.
Captain....	James F. Gregory.....	Do.
Captain....	Henry M. Adams.....	Do.
Captain....	James Mercur.....	Do.
First Lieut.	Charles E. L. B. Davis.....	Do.
First Lieut.	Benjamin D. Greene.....	Do.
First Lieut.	John H. Weedon.....	Do.
First Lieut.	George M. Wheeler.....	Do.
First Lieut.	James B. Quinn.....	Do.
First Lieut.	Daniel W. Lockwood.....	Do.
First Lieut.	Ernest H. Ruffner.....	Do.
First Lieut.	John C. Mallory.....	Do.
First Lieut.	Clinton B. Sears.....	While stationed at Los Angeles was consulted as to size, quantity, &c., of pipe for distributing water over a ranch. Also examined and gave opinion on the irrigation of a large ranch near Los Angeles.
First Lieut.	Thomas Turtle.....	Not any.

Rank.	Name of officer.	Report of officer.
First Lieut.	Edward Maguire	Out in the field with General Terry. No report received.
First Lieut.	Frederick A. Mahan ..	No report received.
First Lieut.	Charles F. Powell.....	Not any.
First Lieut.	Frederick A. Hinman.	Do.
First Lieut.	Albert H. Payson	Do.
First Lieut.	John G. D. Knight.....	In 1871 and 1872 gave instruction in military tactics to pupils of a private school near Fort Schuyler. In 1874 made a small map showing proposed division into city lots of a piece of land in San Francisco.
First Lieut.	Richard L. Hoxie	Not any.
First Lieut.	Edgar W. Bass	Performed duty in connection with observation of the transit of Venus. Order of the Secretary of War.
First Lieut.	William L. Marshall.	Not any.
First Lieut.	Joseph H. Willard	Do.
First Lieut.	Eric Bergland.....	Do.
First Lieut.	Samuel E. Tillman....	Performed duty in connection with observation of the Transit of Venus. Order of the Secretary of War.
First Lieut.	Philip M. Price	Not any.
First Lieut.	Francis V. Greene	Do.
First Lieut.	Carl F. Palfrey.....	Do.
First Lieut.	William H. Bixby.....	Do.
2d Lieut....	Henry S. Taber.....	Do.
2d Lieut....	William T. Rossell.....	Do.
2d Lieut....	Thomas N. Bailey.....	Do.
2d Lieut....	Thomas W. Symons....	Do.
2d Lieut....	Smith S. Leach.....	Do.
2d Lieut....	Daniel C. Kingman....	Do.
2d Lieut....	Eugene Griffin.....	Do.
2d Lieut....	Willard Young.....	Do.

LINES OF COMMUNICATION BETWEEN SOUTHERN COLORADO AND NORTHERN NEW MEXICO.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

The report of Lieutenant Ruffner relative to lines of communication between Southern Colorado and Northern New Mexico.

MARCH 31, 1876.—Referred to the Committee on Military Affairs.

JUNE 8, 1876.—Ordered to be printed and recommended to the Committee on Military Affairs.

WAR DEPARTMENT, March 29, 1876.

The Secretary of War has the honor to transmit to the House of Representatives, in compliance with the resolution of the House dated the 15th instant, copy of the report of Lieutenant Ruffner and accompanying papers, relative to lines of communication between Southern Colorado and Northern New Mexico.

ALPHONSO TAFT,
Secretary of War.

WAR DEPARTMENT,
Washington City, April 6, 1876.

SIR: The report of Lieut. E. H. Ruffner, Corps of Engineers, has been sent to the House of Representatives and should be printed. The maps accompanying the report should be photolithographed.

Very respectfully,

H. T. CROSBY,
Chief Clerk.

Hon. S. B. ELKINS,
House of Representatives.

HEADQUARTERS DEPARTMENT OF THE MISSOURI,
OFFICE OF THE CHIEF ENGINEER,
Fort Leavenworth, Kans., January 28, 1876.

SIR: I have the honor to submit herewith a report on the lines of communication between Northern New Mexico and Southern Colorado, and

include therein a report on a "survey for a direct wagon-road from Fort Garland, Colo., to Fort Wingate, N. Mex.," made by Lieut. G. S. Anderson, Sixth Cavalry, under my directions in 1874. These reports, made in obedience to verbal instructions of the department commander, have been so long delayed because of inability on my part to have the drawings completed, owing to lack of funds for payment of the services of a draughtsman. The map contains so much new matter, and the relations of sections of the country in question to each other have changed so much in late years, that I hardly felt justified in making a report, which would be unintelligible without proper maps. I hope, as it is, that if my views meet the approval of the department commander there will be ample time to forward this report for the consideration of the desired appropriation. I venture to suggest that, as the roads reported on if completed would be immediately used as much for civil as military purposes, and because their very construction would, by the additional protection afforded the civil interest, invite a travel now unknown over the lines in question, it would be eminently proper that the items be inserted in the appropriation bill for "sundry civil expenses of the Government."

I hope this report may be printed; and I believe that the first or general map may be of sufficient value to warrant its reproduction by photolithography.

I am, sir, very respectfully, your obedient servant,

E. H. RUFFNER,
First Lieutenant Engineers.

ASSISTANT ADJUTANT-GENERAL,
Department of the Missouri.

[First indorsement.]

HEADQUARTERS DEPARTMENT OF THE MISSOURI,
Fort Leavenworth, Kans., January 31, 1876.

This report is respectfully forwarded. It is complete and needs no explanation. I desire to say, however, that every day makes more necessary better wagon communication between Southern Colorado, and especially between the railroad termini, and the valley of the Rio Grande. This work is needed very much for military but far more for commercial purposes. The routes described in this report, and carefully delineated on the maps, lead from Pueblo (the terminus of the Denver and Rio Grande Narrow-Gauge Road) and from Las Animas, the junction of the Kansas Pacific and Atchison, Topeka and Santa Fé roads, to a common point, (the Abeda Pass,) which traverses the lofty range of mountains separating the valley of the Rio Grande from the great plains east of the Rocky Mountains.

The route thence descends into the valley of the Rio Grande at a point near Fort Garland, and thence following substantially the valley of the river conducts to Santa Fé, N. Mex., at which point roads diverge in every direction to the main body of settlements and towns in New Mexico. Near Santa Fé terminates substantially at the north, the wide valley of the Rio Grande, which, to a distance of three hundred miles south, is almost a continuous succession of towns, villages, and farms, and in that distance embraces three-fourths of the population, and a larger proportion of the wealth of the Territory.

A considerable sum has already been expended, and well spent, too, in improving the road from Santa Fé to a point near Taos, and a very fine road has been completed nearly the whole distance. There still remains an interval of about twenty-five miles where work is needed, and

for this work an appropriation of \$10,000 is needed and asked. With a judicious expenditure of this amount, certain to be made by Lieutenant Ruffner, engineer, who has made that portion of the road now complete, it is certain that the best, shortest, and most available route in every respect will be established with New Mexico. The advantages of this route, and the distance saved, are fully set forth in the inclosed report and maps, and the subject is of so much importance, not only to the military service, but to every commercial and political interest in New Mexico, that I urge, as strongly as is proper, that an appropriation be asked and pressed in the manner suggested by Lieutenant Ruffner.

The appropriation asked for a wagon-road from Fort Garland to Fort Wingate would be of great advantage to the military force, and of indirect advantage in opening better communication with Arizona, but I consider the completion of the wagon-road from Santa Fé up the valley of the Rio Grande, and thence to the railroad termini of such consequence, both to the military and commercial interests of Colorado and New Mexico, that I venture to urge it with unusual earnestness.

The old route, and that mainly in use now because of local difficulties on that for which an appropriation is asked, is much longer and less advantageous in every respect, and conducts through the same range of mountains after a long detour. The necessity of free and better communication has outgrown the old route, and unless the road along the Rio Grande, needing so small an amount, is completed, the difficulties and embarrassments will every day increase.

JNO. POPE,
Brevet Major-General, Commanding,

[Second indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, February 7, 1876.

Respectfully forwarded to the Adjutant-General of the Army. I indorse the recommendation of Brigadier-General Pope for an appropriation of \$10,000 for the completion of the wagon-road from Fort Garland to Santa Fé, by way of Taos, on the east side of the Rio Grande River; but I am not prepared at this time to recommend an appropriation for the construction of a wagon-road from a point near Fort Garland to Fort Wingate, over the short route by Tierra Amarilla, surveyed and reported upon by Lieutenant Ruffner.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

[Third indorsement.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, February 11, 1876.

Respectfully referred to the Chief of Engineers.

E. D. TOWNSEND,
Adjutant-General.

[Fourth indorsement.]

OFFICE CHIEF OF ENGINEERS,
Washington, February 18, 1876.

The information contained in the accompanying papers and maps has been noted in this Office, and they are respectfully returned to the

4 COMMUNICATION BETWEEN COLORADO AND NEW MEXICO.

Adjutant-General. The importance of completing the military wagon-road on the east side of the Rio Grande between Fort Garland and Santa Fé is fully set forth in Lieutenant Ruffner's report and the preceding indorsements. The sum of \$31,444.80 has been appropriated for this road by acts of March 3, 1873, and March 3, 1875. Lieutenant Ruffner estimates that the sum of \$10,000 is required to make it available for Government transportation, which upon its completion would avoid the long detour via Trinidad, Cimarron, and Fort Union. Respecting the proposed military wagon-road from Fort Garland, Colo., to Fort Wingate, N. M., via the Tierra Amarilla and the western flanks of the Gallinas and Jemez Mountains, the attention of the honorable the Secretary of War is respectfully invited to Lieutenant Ruffner's tables showing the savings in distance which it would effect between Fort Wingate and the present and prospective termini of the railways from the East. The amount of Government transportation to Fort Wingate, not including Indian supplies, he estimates at about 475 tons annually, and its annual cost as \$7,500 per one hundred miles.

By direction of Brigadier-General Humphreys, and in his absence.

GEORGE H. ELLIOT,
Major of Engineers.

[Fifth indorsement.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, February 21, 1876.

Respectfully submitted to the Secretary of War with reference to the preceding indorsement from the Chief of Engineers, to which attention is respectfully invited.

E. D. TOWNSEND,
Adjutant-General.

REPORT ON LINES OF COMMUNICATION BETWEEN COLORADO AND NORTHERN AND WESTERN NEW MEXICO.

The long detour in passing from the present end of railroad communication in Colorado to Fort Wingate, in New Mexico, has made a shorter route desirable for some years past. With a view to improving and shortening this route, the department commander directed an examination to be made under the orders of the commanding officer of the district of New Mexico, and in 1872 the acting engineer officer of the district, Lieut. C. C. Morrison, Sixth Cavalry, was engaged for two months in a reconnaissance of several routes. The results, though valuable, not being conclusive, the subject was again considered, and verbal directions guided the design and main features of the survey, now to be reported upon. A schedule submitted by myself was approved, and was carried into effect as detailed in the report of Lieut. G. S. Anderson, Sixth Cavalry, to whom was given the direction of the survey. I myself at the time was engaged in the personal supervision of the construction of a wagon-road from Santa Fé to Taos, N. M.

From Fort Garland to West Las Animas and to Pueblo, fine wagon-roads have existed for many years. From West Las Animas to Pueblo, a projected line of railway was at that time in contemplation, and is now in process of construction as a continuation of the Atchison, Topeka and Santa Fé Railroad from West Las Animas, to which point it has recently been extended. The Denver and Rio Grande Railway have

graded a line from Pueblo south to the Cucharas River, and at the time of the survey were not only working on this line, but talking of still further extension to the west, even into the valley of the Rio Grande.

For these reasons, I selected Fort Garland as the best point to the west of the Sangre de Cristo range from which to start the survey.

The general direction chosen was south-southwesterly to the headwaters of the Puerco River, near the northwestern extremity of the Gallinas Mountains, where connection would be made with the work of Lieutenant Morrison. Lieutenant Anderson left Fort Lyon with his party May 30, 1874, and commencing his survey at Fort Garland was engaged in the work until July 15. He then broke up the party, and returning to Fort Lyon July 20, reached this place July 24, submitting his report immediately.

Owing to the commencement of hostilities in the Indian Territory, Lieutenant Anderson was not allowed to prepare as full a report as would have been desirable, and as he was in the field for six months, and shortly afterward his regiment was ordered to Arizona, I have not been able to obtain as complete details as many points require.

I shall now proceed to give a brief description of the present lines of communication between the railroad and Fort Wingate, and then, by comparison, invite attention to the principal features of the new route.

DESCRIPTION OF EXISTING LINES OF COMMUNICATION.

From the Arkansas River to the southern points Sangre de Cristo range.—The present point of departure for New Mexico from the railroad is West Las Animas, Colo. The recent extension to this point from Granada of the Atchison, Topeka and Santa Fé Railroad has concentrated here for the present all trade passing over this and the Kansas Pacific Railways. The route followed by freight to the south is known as the Dodge road. This, going to the east of the Raton Spur, avoids the pass of that name, and is more direct. It joins the stage-road, which goes through Trinidad, in the vicinity of Fort Union, and is, by some eighteen miles, the shorter of the two. The regular stage-road from Pueblo to Fort Union is only five and a half miles longer than the short road from West Las Animas to Fort Union, and the farther extension of the railway up the valley of the Arkansas to Pueblo, as is proposed, would not materially alter the freighting distance to New Mexico, so long as it shall be necessary to make the easting requisite to pass the Raton Mountains, a condition apparently unavoidable by the east flank of the range.

From Fort Union to the south a distance of about twenty miles is required before the chain of mountains to the west can be approached in making the change of direction toward Santa Fé and the western portions of New Mexico. In this two hundred and twenty-five miles of distance from the Arkansas to Western New Mexico, about one hundred and seventy-seven miles are southing, while only about one hundred and twenty-two are westing. If, however, the railroad terminus should be even as far west as Pueblo, eighty-six miles farther up the Arkansas River, the condition would not be bettered, as the same southing would be required and the only westing made by wagon-road would be thirty-six miles, although the total distance traveled would be the same.

Along this portion the conditions are favorable to freighting. The grades are very good, with the exception of the passage of the Raton Mountains, which now, in the long easy slope of the customary route, presents no serious obstacle. The grass and water are ample in quan-

tity and good in quality. Delays occur frequently from incidents of the weather—unusual snows at times, heavy rains in the rainy season, or protracted drought at other periods. Still, these delays do not seriously embarrass trade nor extend over many days at a time. The altitude of the highest point, the Raton Pass, is not great enough to make any practical difference in winter or early spring between this and other portions of the road, and in fact the uniformly high altitude of the whole area in question renders the climate more dependent upon this condition than on the element of latitude, and if the route is in good condition in one portion it is apt to be so in all. In the rainy season storms sometimes cause the streams to rise so as to be impassable, but this is exceptional, and the delay is rarely more than a day or two, or long enough for the water to run out. The most important of these streams are bridged. A daily line of stages runs from Pueblo and West Las Animas, joining at Trinidad, via Fort Union and Las Vegas, to Santa Fé.

From south point Sangre de Cristo range to the Rio Grande.—The next section of the route to be described is that embracing the various roads passing from the east slope of the mountains to the valley of the Rio Grande. Of these, the most northerly is that up the valley of the Pecos River, and thence, via Santa Fé, to Peña Blanca, on the Rio Grande.

The most southerly pass is via Anton Chico and the cañon Blanco to Albuquerque, and is, perhaps, thirty miles farther south. The character of the country now becomes different from that previously encountered. The smooth roads of the prairie are replaced by rocky hills at times, and at others sandstone strata nearly horizontal in position make the road difficult and the grass scanty. The cañons and sandy or gravelly ridges of the elevated plateau upon which Santa Fé is situated are succeeded by the sandy valley of the Rio Grande, and throughout the whole region the abundant grasses of the eastern front of the mountains are succeeded by a scanty growth, which a delayed rainy season will almost cause to disappear. In the cañons of the more northerly route the snows of a late spring sometimes cover the grazing pastures to such an extent that the starving cattle of the freight-trains, dependent entirely upon this fortuitous grazing, can hardly drag light loads over the heavy roads. Although the main chain of lofty mountains abruptly breaks down in the vicinity of Santa Fé, still the plateau itself maintains its high altitude, and is nowhere lower than 6,000 feet, continuing in a southwest direction until south of Albuquerque, when high mountains again appear. Isolated masses like the Placeres and the Sandia Mountains form obstacles which are avoided only by following down the cañons which seam their sides. From this plateau to the valley of the Rio Grande, by all the routes, necessitates a descent of 1,500 feet in from ten to eighteen miles. The greater portion of this fall is by one road concentrated in one tremendous hill at La Bajada. The ascent to this plateau from the east is fortunately more gradual, and from Anton Chico, which has about the same elevation as the Rio Grande at Peña Blanca, from thirty to forty miles may be given as occupied in the rise. The valley of the Rio Grande is fortunate only in the abundance of good water. The universal occupation of tillable ground by a crowded population allows no pasturage that is not already overstocked, and the sandy mesas furnish a scant substitute, which is only too kindly described as "poor." The roads are good in some places, but are more often sandy. The only route, however, in which the valley of the Rio Grande is followed for any distance is in going from Santa Fé via Algodones and Albuquerque, where twenty-three miles are located in the valley.

From the Rio Grande to Fort Wingate.—From the Rio Grande to Fort

Wingate two routes are followed: the lower, via Albuquerque, one hundred and twenty-four miles; the upper, to the west from Peña Blanca, one hundred and fifty miles.

The latter, passing through the rolling foot-hills of the Valles and Jemez Mountains, and across the shattered remnants of the extremity of the lava-field of the Rio Grande, is tedious with sand, and broken with low gravel-hills as far as the Jemez River, at San Ysidro. Scanty grass is the rule, and there is no water between the Rio Grande and the Jemez.

After leaving this portion the road improves, and, although rolling and broken, the lava formation of the first few miles no longer appears, and the absence is not a loss.

At the Rio Puerco the new or proposed route comes in from the north, and from this point to Fort Wingate the two coincide. Water can be found every twelve to eighteen miles; the grazing improves in quality and quantity as one goes farther west; and the road is fair—never very good, never very bad—with sand and clay. The lower route meets the same obstacle after crossing the Rio Grande. Heavy sand-hills and a desolate rolling country separate the dry bed of the Puerco from the Great River of the North. Upon reaching the bed of the San José a good road is met. Gypsum disappears, muddy pools become a running stream, and there are agricultural spots. At Blue Water, thirty-eight miles to the east of Fort Wingate, the other route is joined. These two lines deviate from a direct line in order to pass the imposing mass of Mount Taylor, and one passes to the north as much as the other to the south. This huge peak rears its lofty form, superb in grandeur and regal in its isolation. Scarred volcanic rocks drift down its sides and are lost in its vastness. Its huge base of thirty miles in length and fifteen in width forms a worthy foundation to the structure, piercing to the skies. Easily seen from Santa Fé, one hundred miles to the east, it is the monarch of these desolate, weather-worn, and wasted lands. Sandstone mesas, water-washed, reach out from the mountain's skirts and repel approach.

Over both routes freighting can be done, and easily; but the difference between the "plains" and these barren mesa-lands, with their scattered pools of water and scant grass, is very great. Over the upper road a regular mail-route has recently been established, a buckboard going twice a week from Santa Fé to Fort Wingate and returning.

Although freighting and, indeed, communication of every kind has heretofore passed from the east to Fort Wingate by the route just described, almost exclusively, still it is not the only way in which it might be done. In lieu of making the detour around the Santa Fé end of the mountains, they may be crossed to the north and the road correspondingly shortened. As will be shown, there was good reason why this was avoided until very recently, and for further reasons it will always be accompanied with objections unless natural obstacles are converted into aids.

By Fort Garland and the west of the mountains to Santa Fé.—Wagon communication between Pueblo and Santa Fé, by the western side of the Sangre de Cristo range, has been possible for many years. It has always been very difficult until recently; but with the completion of the military road from Santa Fé to Taos, a great improvement has been made. From Pueblo, or, indeed, from Las Animas, to the passes, we find excellent wagon-roads over hard prairie or by the slopes of the foot-hills. Abundant grazing and good water can always be found. The country is well populated with stock-farmers, and there is also increasing attention given to agriculture. The stage-road from Pueblo to Trin-

idad passes by ranches wherever agriculture seems possible; and, indeed, the recent conversion of the gravelly, barren mesa south of Pueblo into a beautiful village, with shady streets of green trees, strikes the traveler from the Eastern States as little short of miraculous.

Crossing the mountains.—The mountains are crossed by toll-roads built over the Sangre de Cristo and Abeyta Passes. By long gentle slopes the ascent is made up the valleys of mountain-streams, with abundance of good grass, water, and timber at every spot. The approach to the summit is steep but short, and the descent on the western side is very gentle and is made through similar surroundings. The beautiful high valley at the summit seems intended to invite a rest before encountering the monotonous plains on either side, or after the fatigue of the ascent. The snow need not block the passes longer than the plains. With sufficient travel to keep the road clear, there would not be any interruption during the year. A fall of snow remaining on the plains would of necessity stop all freighting, but when it melts there it will also in the pass, except in a few narrow and short cañons which could be cleared if necessary. There was no interruption during the winters of 1874-'75.

The San Luis Park and its roads.—The San Luis Park is entered at the foot of the pass, and at this point Fort Garland is situated eighty-one miles from Pueblo, and one hundred and sixty-one miles from West Las Animas. From Fort Garland to the west and north, through the San Luis Park, fifty-five miles of natural road from the commencement of the route to the San Juan mining district, thirty-eight miles to the southwest over an excellent natural road, excepting only the crossing of the Rio Grande, forms the first section of the proposed route to Fort Wingate and Arizona, fifty-five miles to the south over the same excellent and level road furnished by the San Luis Park, will bring us to the Rio Colorado on our way to Santa Fé. A fine grazing country, with abundance of mountain-streams, the only drawback is, perhaps, that the number of cattle on the range is too great, and the pastures are overstocked.

We now commence to cross the foot-hills which reach out to the river or near it, and the Park is left with many feelings of regret and longing for its beautiful roads.

Rio Colorado to Taos.—From the Rio Colorado to Taos, about twenty-five miles of bad road are encountered; steep hills, up and down which the road goes without the slightest regard to the action of gravitation, are additionally annoying to any one who will notice how easily they may be turned or the road relocated on reasonable grades. The soil is good, and grazing abundant, and water is found almost anywhere.

The pine forests of the mountains come down over these foot-hills, and there is a surprising quantity of fine timber. The valleys of the streams are found in cañons, and the lava-field of the Rio Grande has spurs stretching up these cañons to the permanent ruin of all roads found therein. In order to make this section of road really safely passable, work must be done between the Rio Colorado and Taos to considerable extent.

In the valley of Taos is found at present the most valuable agricultural district in New Mexico. A population of 7,000 is engaged mainly in the cultivation of wheat and corn. Two flouring-mills are supported in the manufacture of what is considered peculiarly fine flour. Large quantities of this flour are consumed in Santa Fé, and during the past year the contract for Fort Union was held by parties who filled it from this region.

Taos to Santa Fé.—Between Taos and Santa Fé there formerly existed a very disagreeable passage by a steep and bad road over a mountain-spur reaching from the main chain to the cañon of the Rio Grande. This spur, called the Picuris range, could be avoided only by a long detour crossing the Rio Grande twice. Freight, except such as could be carried by burros, was almost prohibited, and the customary route for individuals going from Santa Fé to Fort Garland, was via Fort Union and the Sangre de Cristo Pass in preference to attempting the more direct line.

Now, however, through the munificence of the General Government, a new road has been constructed down the cañon of the Rio Grande, and a level route, straighter than either of the old roads, can accommodate all possible travel.

The last forty miles of this route pass through a country remarkable for its barren desolation; hills of drifting sand or gravelly soil support almost nothing, and every spot capable of cultivation is occupied. Freight by cattle-teams must always be very difficult through this region. It should be remarked, however, that the approach to Santa Fé from any direction is but a slight improvement on this picture. Arriving at Santa Fé from Pueblo we have saved eighty-one miles in distance over the present stage-road via Trinidad and Fort Union. With the improvement in the road made between Taos and the Rio Colorado this line would be far preferable as a stage-route from Pueblo to Santa Fé and the south, and, as it is, several days may be saved in travel by Government teams passing between the two places, and drawing their forage from the regularly-established agencies. From Las Animas to Santa Fé the two routes differ only by eight miles, and each extension of the railroad up the Arkansas River will shorten the distance by the west of the mountains without influencing that on the eastern. We have now looked at all of the existing routes to the region in question.

Perhaps, were the freighting conditions equally as good by the west of the mountains as by the east, there would be no cause to improve upon the route last described. But we are here confronted by two rather remarkable physical features of the country, which it might be interesting and instructive to describe.

Lava-field of the Rio Grande.—In the first place, there is the lava-field of the Rio Grande. This is a tremendous exhibition of volcanic power. Commencing at the angle between the Conejos River and the Rio Grande, in Colorado, one continuous sheet covers the face of the country to the south for eighty miles unbroken, and then for fifty miles farther is now exhibited in outlying areas and detached masses, separated from the main body only by the exercise of the power of erosion through prolonged ages. One hundred and thirty miles in length, and perhaps thirty in breadth at its widest place, the area of a principality lies swallowed up forever. From craters existing, probably, in the San Antonio Mountain and the Ute Peak, and possibly in other centers, this flood poured over the land. Reaching to the east, it was checked by the mountains of the Sangre de Cristo range; flowing to the west, the mountains and hills of the main divide and the spur now between the Chama and the Rio Grande limited its extent. To the south it was deflected westwardly by the spur of the mountains called the Picuris range, some fifteen miles south of Taos. Protected by this spur, we find the east bank of the Rio Grande for many miles free from the lava. Confined on the west by the slopes of the Jemez Mountains, the breadth of the field is narrowed; but from the village of San Ildefonso to Peña

Blanca we find the lava on both sides of the Rio Grande, spreading to the east as far as the valley of the Santa Fé Creek. Secondary centers in the Jemez Mountains possibly contributed to this extension, but the main force of the eruptions was probably felt farther to the north. However, in this vicinity the edges and extremity of the field have been reached, and there has been so much erosion at places since its deposition that outlying masses, as in the bluffs to the west of San Felipe, alone remain. Throughout the whole region thus depicted this lava-field is the great and controlling element. The streams that have eaten their way through it with untold difficulty, are found in narrow and deep cañons, having no land for cultivation. A dangerous feat for man to descend these precipices, the passage by an animal is almost impossible. The Rio Grande passes for eighty miles or more through its black abyss, with walls of seven or eight hundred feet in height crowned with perpendicular cliffs of solid lava two and three hundred feet high. Throughout the whole region there is no agriculture. The valley of Taos is formed only by the fortunate detrition of the adjoining mountains spreading over the edges of this plain a thin soil. Outlying patches are cultivated at other points near the perimeter of the basin. Agriculture on the Rio Grande is possible only, as before alluded to, in the section that was, so to speak, in the lee of the Picuris range, or from La Joya to San Ildefonso. The surface of the mesa itself supports a scanty grass which feeds a few wandering flocks of sheep, and the dwarf cedar proves anew its wonderful hardness. In consequence of these features roads across this country are almost an impossibility. From Cienigilla to the Ojos Calientes is found the only wagon-road crossing the mesa from east to west.

The fortuitous cañon of the Rio Chama furnished a route from Santa Fé to the northwest. From Peña Blanca to the west the road is possible because of the erosion of bluffs which were probably as formidable once as those of San Felipe, ten miles to the south.

The road from Fort Garland to Taos keeps to the east of the basin, touching it only at the Rio Colorado and at the Arroyo Hondo. Lieutenant Morrison's route in 1872 is unavailable because of passing over the western shore of this no longer sea of fire, where sterility and absence of water are the rule.

In the construction of the military road from Santa Fé to Taos it was necessary to follow the cañon of the Rio Grande from La Joya to Cienigilla, and the expense of the construction arose from the necessity of passing through the blocks of lava forming the *débris* at the foot of this gigantic mesa cliff.

Under these conditions the problem of passing to the west of this section becomes a strategic one of turning its flanks. The routes via the south point of the Santa Fé range turn it to the south as well as the range itself. The proposed route will turn it by the north.

The marls of Santa Fé.—The second physical feature remains to be described. Underlying this gigantic field of lava, probably throughout its whole extent, certainly in its southern portion, there exists a series of immense beds of marls, sands, and clays, and imperfect sand and limestones. Of many hundreds of feet in thickness, the coarse character of the sand and the immense quantities of gravel show that they are formed by the very rapid erosion of a lofty mountain-range. From this cause the formation of a finely comminuted soil has been impossible. Barrenness and desolation are the results, and the country to the south of the Picuris range and Santa Fé and its vicinity suffers accordingly.

The foot-hills of the mountains and the valley of the Rio Grande are alike sandy and sterile. Narrow strips of ground are irrigated in the immediate vicinity of the streams, but away from these feebly-green spots aridity and bleakness extend. There is no grass except during the few weeks succeeding an usually protracted rainy season. Cattle learn to eat anything that is green, and the sight of the goat eating the thorny stems of the tall cactus is no more striking to the stranger than to see the gaunt ox feeding on the running pine and the dwarf cedar. Sheep and cattle are driven from this region to the "Conejos Country," full sixty miles, to pasture and to winter. The valley of the Chama is similar in its character, being formed by the excavation of the same beds of marl, and the Rio Grande below the junction of this stream never loses its predominant characteristic of sand. These marls extend to Santa Fé and farther south. The Santa Fé Creek irrigates a small portion of tillable land some six miles or more in length in the immediate vicinity of Santa Fé. Besides this and a starving hamlet at Galisteo no sign of civilization breaks the desert solitude of sand and gravel that stretches southwardly down this elevated plateau, save the isolated ranches near the rare springs of water, such useful oases in the passage of this divide. The civil division of the country of Santa Fé very nearly covers this barren area from the Rio Pojoaque to Galisteo. In this country, with a population, by the last census, of 9,699, there is reported as the total area of improved land 10,925 acres only, with a total annual value of farm-products of \$99,410, or about \$9 per acre. This in a country where corn is cheap at 2 cents per pound. The production of wheat was given at 6,314 bushels and corn 20,262 bushels. Beyond necessary working-cattle and horses no stock except sheep are kept in this region; 630 having been reported as the total of "other cattle," held in the country. To avoid the lava-field in going to the West by the South from Fort Garland we necessarily encounter at least sixty-seven miles of this desert.

It might not be an impertinent digression at this point to answer the question why was Santa Fé established in the face of these disadvantages? Its lovely climate, protected as it is from the north by its near mountains, and elevated at 6,840 feet into an atmosphere charming in its freedom from moisture and balmy in its mildness, may perhaps have had its influence. An abundance of excellent water is found at a short depth by digging wells at almost any point of the locality and fresh and sweet; it alone in those regions is reason sufficient for settlements. The immediate vicinity probably supplied its earlier inhabitants with sufficient food for their limited numbers. By reason, then, of these two formidable features it has not been advisable heretofore to use the route thus described in passing from Colorado to Western New Mexico. As shall be shown, however, it is more than probable that early progress in railroads shall make this route a desirable one to Southern New Mexico in case it shall be improved, as indicated before, between Taos and Fort Garland.

It is now necessary to describe the lines of reconnaissance and survey examined in search of a new route, and to give a general view of the country through which they pass.

DESCRIPTION OF NEW ROUTES SURVEYED.

Lieutenant Morrison's route in 1872.—In 1872 Lieutenant Morrison made a reconnaissance by the west side of the Rio Grande. Crossing the river at Meyer's Ferry, he went down the lava-field near its western edge to Ojo Caliente; thence by a long curve to the west and north he

crossed the Chama some fifty-three miles from Ojo Caliente; from this point down the course of the Puerco to the road from Peña Blanca to Wingate, and with it to that place. Unfortunately his report was not as full as it might have been, and I shall endeavor to supplement it from other sources.

It is an interesting historical fact that during the suppression of the Indian insurrection in New Mexico by the Spaniards in 1690-'93, an expedition to conquer the Pueblos of the Taos Valley, having been longer in its undertaking than presupposed, found itself blocked up on its return to Santa Fé by snow in the Picuris range. Fearing to attempt the passage under the circumstances, the plan was adopted of going north into the Utah country, now Colorado, crossing the river above the cañon of the river Grande, probably in the vicinity of the Rio Costilla, and then returning to the south. The line of march on the west side of the river was the same as that followed by Lieutenant Morrison, and the lapse of one hundred and eighty years has found us in nearly as intimate a knowledge of this country as the Spaniards had then.

Conejos to the Chama.—The lava country, of course, through its whole extent, furnishes hard roads, level in stretches, and very rough from detached fragments, which have an almost perfect hardness, weathering very slowly and never crushing into macadam. The cañons of the water-courses on this route and the edges of the field are descended by very rough and very bad roads, incapable of permanent improvement, and not even easy to be bettered.

The longest distance without water is twenty-five and one-half miles, being that from leaving the Conejos and its tributaries to some water-holes on the lava-field. The last stretch of seventeen and one-half miles into Ojo Caliente is without water, and as the road has left the lava, the sand of the marl formation thus discovered makes the traction difficult.

Rolling country and steep hills between Ojos Calientes and the crossing of the Chama, in addition to the undesirableness of the preceding section, do not tend to reconcile one to the long detour thus made between the Conejos and Upper Chama in order to avoid the mountains of the direct line. In this section Lieutenant Morrison examined three routes, and of these recommended one which would necessitate some work before it could be used by wagons. The others have objections to their use in being longer and in other features of a physical character.

Were the curve of the more level route located through a prosperous region, or were the roads smooth and quickly traveled with good grass and abundant water at reasonable distances, it might not be considered worth while to attempt to shorten the line by passing over a chain of mountains. But when the mountain-route has its usual advantage of water at all points and good grass, and its grades are fairly reasonable, the question of cost of construction may well be considered. And when in addition to this the saving in distance, as in this case, amounts to fifty-five miles, the economy of a judicious investment is well nigh manifest.

The Jemez Mountains.—The mass of the Jemez and Gallinas Mountains necessarily deflected Lieutenant Morrison's line, and the north-western point of this obstruction was the objective from Fort Garland selected by me in the line surveyed. The mountains form a bold and imposing feature in the landscape. Rising in swelling masses and terraces, they are always grand in effect and graceful in outline. Culminating in one high summit, every defense of bastion and outlying rampart seemed combined for its protection, alike from the attack of

man or the fiery onslaught of natives. Though lofty enough to be surrounded by the summer-clouds and darkened by the summer-storms, these mountains are not of sufficient area to form and protect mountain-streams, as does the Sangre de Cristo range. Agriculture, therefore, is represented only by the scanty fields of the Jemez River or the withered banks of the Puerco. No communication exists through its forbidding cañons, nor indeed does the prospect even invite a search.

Rio Chama to Wingate.—To the westward still we find the great Atlantic and Pacific divide, with a general direction of south-southwest. Having turned the Gallinas Mountains, our crossing of the Rio Chama is found to be probably not more than fifteen or twenty miles to the east of the crest of the divide. From this point to Blue Water station, a distance of one hundred and forty-seven miles, the road is sensibly parallel to the line of the crest. Bacon Spring is found on the west, and is the first water encountered on the Pacific slope.

The general character of the country, from the line of the road to the north and west, is very much the same everywhere. Recent sedimentary rocks, and soil from their detrition, are the geological features. The altitude of the divide is not great, rarely over 7,000 feet, and the rain-fall is very slight. But the soft soil washes very easily, and the water-courses to the west become cañons at short distances from the sources. Two of these cañons have been carefully examined and described.

The Cañon del Chaco was reported by Lieutenant Simpson, in 1849, to contain remains of a former population of considerable size. Its rocky walls now look down only on a dry bed and dusty ruins. Pueblo succeeding pueblo formerly lined the banks of what must have been a fertile river-valley. To-day not even is it safe for the passing train to depend upon finding sufficient water there except during the rainy season.

Capt. J. H. Macomb passed through the Cañon Largo in 1859, finding it still more desolate than the Cañon Chaco, although exhibiting ruins indicating former habitation. The great divide itself is not a precipitous chain of mountains, but rather a rounded plain, and the whole country is made up of approximately plain surfaces, now cut up into gigantic sandstone mesas, crumbling, dry, and barren. The only routes that can be followed are by the gorges between. It is impossible to cross the system, save with much work and many detours. The topography of this feature is well illustrated by the detail sheets of the accompanying atlas and also by the general map.

However desirable it might be to rectify the line of the route between Chama and Fort Wingate, it would be difficult, if not impossible, to do so with a wagon-road. If we pass to the west, we shall find ourselves on the dry crest of the divide; if still farther to the west, we are in a dearth of water, and a difficult line of travel for all possible reasons.

New route proposed for construction.—Having thus discussed existing lines and the difficulties encountered, the remainder of the description is confined to the portion which is recommended for consideration as to the propriety of constructing a new road. From the Rio Conejos to the Rio Chama, the line surveyed is reasonably direct; the distance, as the crow flies, between the two extremities being about fifty-three miles, while the route chosen by Lieutenant Anderson is sixty-four miles in length, a very slight difference, if it is recollected that 10 per cent. is the usual allowance in the difference of distance between a mountain, or even rolling country-road, and one on the level between two points with the same air-line distance. With this allowance, the curvature will be less than 10 per cent.

As can be seen from the details given in Lieutenant Anderson's report, all the essentials for freighting are found at all points. In passing the divide the line follows the course of some stream all the time, and thus, as in all the mountain-passes in this region of country, the facility of stopping wherever desired makes the passage easier. The distance to be worked is sixty-four miles, and the route chosen by Lieutenant Anderson is approved, with the correction of passing directly down the entire valley of the Hutrias to the ford of the Chama. It is to be noticed here that one objection to this route lies in the fact that there may be snow on the pass during the early spring. In all probability when the Sangre de Cristo pass is free from snow, these mountains will be equally clear, and, at any rate, nine months in the year certainly will be available for all kinds of travel. In the construction of the road, I believe the idea of soldier-labor had best not be entertained. The constant employment during the season of cavalry, and the frequent calls for infantry, would make their labor difficult to procure, fitful, and expensive.

The New Mexican settlements on the Conejos and at Tierra Amarilla, are numerous, and would furnish all the labor necessary and at reasonable rates. From my own experience with Mexican laborers I feel safe in saying that it would be difficult to hire as good men at higher wages in portions of the country where more frequent opportunities of such employment may be found.

I have not been able to collect as exact information concerning the settlements on the Chama as I could wish. From personal acquaintance I know, however, that the Tierra Amarilla country is considered by the inhabitants of the Rio Grande district to be good land, and as this is supported by the census, it is probably correct. During the ten years from 1860 to 1870, although the population of the two counties, Taos and Rio Arriba, has decreased a few hundred, there has been an increase of about a thousand souls in the Abiquiu and Tierra Amarilla precincts; this change being undoubtedly from emigration from the other portions of the counties. The quieting of Indian troubles has probably led to this result, as this region is considered much more favorable to stock-raising than further to the east. The transfer of population referred to is almost entirely concerned with the native Mexicans, and one acquainted with the strength of local ties of this race knows that starvation or hopes of betterment, or both, would be required as incentive sufficient for such emigration. The grazing in this vicinity and in what is known as the "Conejos country," the high land of the northern end of the proposed road, is considered fine enough to warrant the driving of flocks of sheep from the Rio Grande, near the mouth of the Chama, to this pasturage, a distance of at least sixty miles, and cattle are also driven to this region for wintering from the same localities.

What is known as the old "Spanish Trail" to the west passed from Santa Fé up the Chama and through the Tierra Amarilla country, thence crossing the tributaries of the San Juan near the foot of the range. This was surveyed by Capt. J. H. Macomb, 1859. Since the opening of the San Juan mining-region there has been considerable travel by this route to the mines, passing up the Animas River.

The impulse to trade has been slight, but it has been something, and merchandise from Taos and from Santa Fé has gone in this direction. All things considered, this immediate section is the only one in the northern and western portions of this Territory which has an upward look.

GENERAL VIEW.

Having now completed our particular examination of local regions and lines, I propose to give a general view of the situation, embracing both natural and artificial features.

The active rivalry of three railways, the Denver and Rio Grande, reaching to the south; the Atchison, Topeka and Santa Fé, to the south and west; and the Kansas Pacific, endeavoring to prevent the two former from cutting off its resources in those quarters, has already produced valuable results to New Mexico and to the public at large, whatever be the effect upon the owners of the railways or their creditors. Each effort of one to extend its reach is met by a corresponding move on the part of the other. At the moment of writing it is asserted that the rails will be laid from West Las Animas to Pueblo by February next, also that by the same time the Denver and Rio Grande will have ironed its track to the Cucharas, fifty miles to the south of Pueblo. The Kansas Pacific has laid a few miles of track to the south of the Arkansas, and talks of reaching Trinidad in a short time. There is no doubt, at any rate, that all will be done that can be with the resources at command, and that the extensions will be only a matter of time, means, and natural obstacles. Railroad building in the valley of Arkansas and even over the prairies is a different matter from construction among the foot-hills of the range, or from the problem of crossing the latter. The north and south line of the Sangre de Cristo range presents an almost unbroken front from the Arkansas River cañon to Santa Fé, and certainly at present the prospect of its being crossed is not good. While there is nothing very difficult in construction to be encountered, the expense would be much greater than on more level ground, and the grades would always be heavy and the running expenses proportionately great. A uniform grade of 150 feet at the least to the mile would be necessary for fourteen miles to make the pass, or more likely lighter grades at first and heavier near the crest. While this can be done, and the experience in the cañons of Colorado near Denver show that it may be advisable, still in this case there are no rich and well-established gold-mines at the end of a short route, but instead thereof very little trade, and that to be fostered and built up, and it is altogether unlikely that this passage will be attempted immediately. Again, in the direction of Trinidad the bold and high spur of the Raton Mountains offers to the southern passage grades almost, if not quite, as severe as the other line. The continuation of this spur to the east by the Mesa de Mayo and the cañon of the Dry Cimarron has indeed formed the great obstruction to railroad extension toward New Mexico from Kansas and Colorado heretofore. For the same reasons as in the preceding case, it is not likely that any prolongation of either of these lines would be made beyond Trinidad for several years, even supposing the inducement of the fine coal of the vicinity attract them thus far. In all probability, then, two points, one, Trinidad, and the other not far from the foot of the Abeyta or the Sangre de Cristo pass, may be considered as the virtual termini of the system of these three railways.

From Trinidad the southern trade can be reached by the present stage-road over the Raton Pass, and as wagon-roads are being constructed or improved up the Purgatory to the Moreno mines, and across the range to Costilla, in the valley of the Rio Grande, a new system will here be opened.

Through the Abeyta Pass the trade of the San Juan mining country will go, and probably some of the Santa Fé trade also. In case of the

improvement of the road from the Rio Colorado to Taos, all the military freight for Santa Fé and for Southern as well as Western New Mexico will undoubtedly pass this way. From either point no advantages can be obtained by a farther southern extension which cannot be as well gained, together with others, by a westward direction into and over the range. If we now examine the map and recall the physical features already described, we shall see that from these two points we must have converging lines to the west, the one from the more northern point, crossing the range and the Rio Grande to the southwest; the other, from Trinidad, must cross the Rio Grande above its cañon, and the two naturally intersect at the villages on the Conejos or the initial point of my survey. This, then, is the key of the whole situation. If the shipping-point be the Cucharas, the better of the two, the shortest and best line to the southwest is that direct to this point; if from Trinidad, the result is the same. From the location of the initial point, the next step is a certainty. The Rio Puerco must be reached by the shortest line, and then it must be followed.

It is impossible to locate a general route to the west of this line, because of the bad lands of the Atlantic and Pacific divide, and it would be unadvisable to select a direction to the east, because of the lava-field and the Jemez Mountains. It would be unwise to remain on the east of the Rio Grande, because of the detour to the south and its features. A careful consideration of these general conditions leads us to the conclusion that for many years the shortest, best, and most advisable wagon-road will be located about as described and recommended for construction.

It only remains to call attention to the needs for such a road and its advantages.

INTERESTS AFFECTED BY PROPOSED ROAD.

The post of Fort Wingate was established when the Navajo Indians were removed from their reservation on the Pecos River to their present one, the latter being their native home before their subjection by the Army. The garrison is intended as well to protect these Indians from the whites as to impress upon the former that they are no longer the lawless marauders of the preceding decade. The tribe is the most important one in New Mexico. They are intelligent and superior, physically, to any other of the neighboring natives. They have always maintained a high reputation for innate industry, having engaged in agriculture as well as in manufacturing many articles of domestic life. They are now quiet and law-abiding, and are reported to be anxious to improve, and are willing to work. In fact, if there be any prospect of a radical improvement in the red man in this region of country, the Navajos offer the only hope to the sanguine. They number over 9,000 now on the reservation, and are considered not to be decreasing in numbers. They are contented with their reservation and their fate, and we cannot foresee any likelihood of a change in their temper, feelings, or welfare likely to lead to a change of location.

The garrison at Fort Wingate is, therefore, the most permanent as well as the most important in New Mexico, and good communications to it from other posts and from the supply-points should be more carefully sought for than to any other points. Two companies of cavalry and two of infantry have been the ordinary garrison, and subsistence-stores, clothing, and camp and garrison equipage, and miscellaneous quartermaster stores must be freighted there from the east. The estimated

annual allowance for such a garrison is about 628,000 pounds. The post of Camp Apache in Arizona has been supplied of late years from the East, via Fort Wingate. Allowing half as much more for this garrison, and we have an annual total of about 942,000 pounds. At the present very reasonable rates of freight on this contract, a saving of one hundred miles of distance would result in an economy of \$7,573 per annum. Besides this, an allowance should be made for the stores shipped for the use of the agency at Fort Defiance. These are brought over the same route, and although they probably are not of great weight or value, they should be considered. I am unable to report the exact figures, not having access to the proper sources of information. The appropriation for the support of this particular tribe, last reported, was over \$80,000.

The fact that stores are shipped to Camp Apache from the East now, shows that every extension of the Colorado Railroad system, and every improvement in connecting roads, will lessen the expenses of the military service in Arizona by extending the perimeter which can be supplied from the East as cheaply as from the West. The unlikelihood of railroad enterprise in Arizona from the Pacific side makes it the more incumbent to stimulate advances from the East.

A secondary consideration should here be considered. The San Juan mining district, occupying the mountains at the head of the Rio Grande and almost exclusively on the Pacific slope, has been growing in importance, and has been filling up with the usual class of population. Although the mining operations are now conducted on lands ceded by the Ute Indians, experience shows that there will be no hesitation in extending their prospecting on to lands belonging to the Indians, and exciting thereby their dissatisfaction, if the miners should so desire. In that case a military force would be called for at once, and the probable result would be that a permanent post to the west of Fort Garland and looking upon the mines would be established. One of the present routes to the San Juan country is up the Rio Grande, and making the pass at the head of that stream. This pass is 12,370 feet high, or nearly 3,000 feet higher than the Sangre de Cristo Pass. The other pass is via Saguache and the Lake Fork of the Gunnison River, crossing the divide to the head of the Animas River at an elevation of 12,150 feet.

From the fact of the high altitude of these passes, the snow lies deep and long into the spring. From the reconnaissance made under my directions in the spring of 1873, it was reported that on the 9th of June, in crossing this divide at the head of the Rio Grande, nearly three miles lay "over and sometimes through continuous sheets of snow, in many places of great but unknown depth, generally, however, from 4 to 8 feet." On the 25th of June, on the pass from the Animas River to the Lake Fork, the report says, "There was much very deep snow, which fortunately bore the animals and bridged many gorges which would make the pass nearly impracticable without the snow." This remark applying only to pack animals, was verified during the summer of 1874 by Captain McCleave, Eighth Cavalry, who was compelled to take pack animals in making the trip to the mining regions by this road. By passing to the mines by the lower route, crossing the Chama spur by the proposed wagon-road, the Atlantic and Pacific divide is crossed at an elevation of only 7,600 feet, and the outlying hills are nowhere reported over 8,000 feet. The Animas River is reached at the elevation of 6,410 feet, and, following up that stream, the road nowhere exceeds 10,500 feet in altitude, and the elevation of Baker's Park itself is 9,600. A route averaging 3,000 feet less in altitude must be equivalent to a month

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or six weeks' additional time in the spring, and this fact may well be considered in the formation of an opinion on its desirability. This lower road can be and is used by crossing the Rio Grande at Cieniguilla and thence by Abiquiu or El Rito to Tierra Amarilla, but the detour for military purposes from Fort Garland would amount to fully sixty miles.

The following tables give the various distances from the present termini of the railroads to Fort Wingate by different routes, and the distances from the probable termini of the railroads on the 1st of July next.

By proposed route :

	Distance between intermediate station.	Distance from Pueblo.
Pueblo to Fort Garland.....	81. 14	81. 14
Initial point of survey.....	38. 00	119. 14
Crossing of Rio Chama.....	63. 98	183. 12
Puerco Station.....	83. 06	266. 18
Fort Wingate.....	102. 41	368. 59

Fort Wingate to West Las Animas :

Via Fort Union, (tables of chief quartermaster Department Missouri).....	474
Via Trinidad and Fort Union.....	496
Via Santa Fé and Fort Garland.....	488
Via Lieutenant Morrison's route of 1872.....	504
Via proposed route.....	448

Fort Wingate to Pueblo :

Via Trinidad and Fort Union.....	476
Via Fort Garland and Santa Fé.....	408
Via Lieutenant Morrison's route of 1872.....	424
Via proposed route.....	369

Fort Wingate to Cucharas Station :

Via Fort Union.....	424
Via proposed route.....	347

Fort Wingate to Trinidad :

Via Fort Union.....	385
Via Costilla and proposed route.....	339

Santa Fé to Cucharas Station :

Via Fort Union.....	254
Via Fort Garland and Taos.....	210

Santa Fé to Pueblo :

Via Fort Union.....	305
Via Taos.....	232

Santa Fé to Cucharas Station via Taos and Fort Garland.....	210
Santa Fé to Trinidad via Fort Union.....	215

Saying in distance by proposed route over present shortest routes of wagon-transportation between Fort Wingate and West Las Animas.....miles..	26
Pueblo.....miles..	105
Cucharas Station compared with present railroad terminus.....miles..	125

Probable saving in distance July 1, 1876, in wagon-transportation between railroad terminus at Cucharas and Santa Fé by Abeyta Pass and Taos, over present distance from West Las Animas to Santa Fé, ninety miles.

Probable saving in distance for light or spring-wagon transportation between railroad terminus at Cucharas and Santa Fé, via Abeyta Pass, over present, via Trinidad and Fort Union, one hundred and eight miles.

Supposing the railroad termini to be at Trinidad and Cucharas respectively, the saving in distance from Fort Wingate to Cucharas

Station, via proposed route over that to Trinidad, via Fort Union, is thirty-eight miles.

With Pueblo as the terminus of competing roads, freight rates will be as reasonable there as at West Las Animas, and we can sum up the probable advantages of the constructions recommended as follows :

In case of the opening of a wagon-road from Conejos to the Rio Chama, the saving in distance by wagon to Western New Mexico and Arizona will be from twenty-six to one hundred and five miles over present and immediately prospective facilities. In case the additional incentive to railroad extension to the west be sufficient to induce the railroad companies to build into the valley of the Rio Grande, the saving will be as much more.

In case of the improvement of the road from Fort Garland to Taos, the entire Southern New Mexico trade will be benefited in the saving of from forty to eighty miles.

In view of the facts herein described, I am of the opinion that an improvement of the two lines of road from Fort Garland to Taos, and from Fort Garland to the Chama River, is desirable ; and that the interest of the military service would be justified in asking for an appropriation for this purpose.

I therefore respectfully recommend that an appropriation of \$10,000 be requested to improve the "military road from Fort Garland to Santa Fé, N. Mex.," and that an appropriation of \$30,000 be requested to open a "military road from Fort Garland to Fort Wingate, N. Mex., by the shortest practicable route."

I submit herewith a map, showing the lines of communication described in this report and the proposed new road. I also submit an atlas of detail sheets of the survey of the road in question, and would state that were the appropriation requested obtained, work could be immediately commenced, and the road probably would or could be in use by the middle of September of this year.

I invite attention to the report of Lieut. G. B. Anderson, Sixth Cavalry, appended, and to the general tables of distances and descriptions compiled from the notes of the survey.

I am, very respectfully, your obedient servant,

E. H. RUFFNER,
First Lieutenant Engineers.

FORT LEAVENWORTH, KANS., *July 25, 1874.*

SIR : I have the honor to submit the following report of an expedition, while under my direction, for the survey of a wagon-road from Fort Garland, Colo., to Fort Wingate, N. Mex.

By the letter of May 13, 1874, from the assistant adjutant-general Department of the Missouri, I was directed to take charge of an expedition "engaged in examining the practicability of building a wagon-road in a direct line from Fort Garland, Colo., to Fort Wingate, N. Mex.," and the following was given me as a "schedule of route:"

Fort Garland to Rio Grande at most convenient crossing both for road and river.

Leave Rio Grande, going up the Conejos and across the divide to the headwaters of the Chama Rivers.

Down the west side of the Chama to the west of the Jemez Mountains and the divide between the Chama and the Puero. In this schedule the important point is the finding of an easily-worked and good-grade passage of the divide between the Rio Grande and the Chama.

New routes should be shown returning.

By verbal instructions, received from yourself, I was made more fully acquainted with the nature and details of the work to be accomplished.

My report will embrace: First, a description of the organization of the party for field-service; secondly, a general account of the instrumental work done; thirdly, a description of the physical character of the country passed over; fourthly, a comparison of the two routes over which lines were run, with reference to their practicability for purposes of a road; fifthly, recommendations and estimates. The report is accompanied by an appendix, which contains a tabular statement of the distances from camp to camp and the latitudes and departures obtained by stadia-theodolite and other information.

The party was organized as follows: An assistant was placed in charge of the stadia, and recorded the azimuths of the various courses; a recorder was charged with the reading of the rods and with the topography; an escort of one corporal and seven men was employed in bearing the rods and doing the fatigue-work of the expedition.

Assistant D. W. Campbell and Recorder Samuel Austey reported to me at Fort Lyon, Colo., on the evening of May 27; on May 28 I arranged my detail and prepared for starting, but was detained until the 30th by an exceptionally severe rain-storm, which lasted three days, and swelled the Arkansas River beyond its ordinary high-water mark and rendered the road almost impassable.

The bridge across the Arkansas at Las Animas being burned, I was obliged to go by way of Pueblo to obtain a crossing. I reached Pueblo on June 2, and Fort Garland on June 5, and at once proceeded to the organization of my party for the field. Assistant Campbell and Recorder Austey were charged respectively with the instrumental work, and with the topography. Corporal Sickles, M Company, Sixth Cavalry, was given charge of the pack-train and the fatigue labor of the expedition. Private Tomson, G Company, Third Infantry, and Private G. W. Brown, M Company, Sixth Cavalry, carried the rods. I devoted my time to reconnaissance-work, and rode ahead each day to determine a line and a camp for the day succeeding.

The instrumental work performed consists of a line run from an established point on the land survey, (about 100 yards south of the convent at Conejos, Colo.,) via the Conejos and Los Pinos Rivers, and the west branch of the Chama to Tierra Amarilla; thence across the Chama and the heads of the Gallinas and Capulin Creeks to the divide at the head of the Puerco. On our return, a second line was run from Tierra Amarilla to our point of departure at Conejos, via the Nutritas Creek and the heads of Vallicita and Patoca Creeks, and the west branch of the San Antonio.

Our point of departure was 13 chains west of section corner between 19 and 20, of township 33 north, of range 9 east, of N. M. meridian. The instrument used was a stadia-theodolite, made by Aloe, of Saint Louis, 5-inch horizontal limb, with two verniers reading to 20"; telescope $8\frac{1}{2}$ -inch focal length, $1\frac{1}{8}$ -inch aperture. The vertical limb read by a vernier to single minutes. The New York leveling rod, with double targets, was used, and was read by the topographer, or in his absence by the rod-man. The lower target was clamped at the "one-foot mark," in order that it might be seen in grass or low bushes, and one foot was afterwards deducted from each reading; to prevent this target from interfering with the sliding of the rods, a piece of wood was inserted underneath the back part of the rod, on which the sliding portion rested when down; a similar piece filled the interval in front and above. A rod made especially for the stadia, with graduations commencing at

some distance from the bottom, would be found very useful in underbrush and over a rolling country. Horizontal distances were determined entirely by stadia readings, and the course was kept by instrumental azimuths taken by back-sights and fore-sights at each station, and by magnetic readings. Observations for meridians were made nightly, as far as the weather would permit, on Polaris.

On June 9 I left Fort Garland and marched in a southerly direction along the road toward Culebra, taking this route because the Rio Grande was not fordable and could only be crossed at Meyer's Ferry, near Costillo.

Owing to the inexperience of my escort as packers, and their need of further instruction, I only traveled about two miles the first day, and made camp on the Trinchera, whence I could take an early start the succeeding morning, with the packing performed under the direction of a practiced packer detailed for my assistance from the fort. I was provided with ten pack-mules and five saddle-mules, four of which latter were ridden by the instrumental party, and the fifth by the corporal. I had with me for my own use my horse, brought from Fort Lyon.

About eight miles from Fort Garland we passed around the east of a point of low hill called Piñon Point. The adjacent country is nearly level and the road a good and perfectly well-defined one. On the Trinchera there was water and wood in abundance, but stock-herds are becoming so numerous in the country that grazing cannot at all times be depended on. The route from this camp to our next (the No. 8 of the expedition) was across the southeast corner of the so-called San Luis Park, but the national features of the country are rather those of a desert; nothing but sage-brush grows on this barren, except on the low hills which in some places dot it, where are seen a few stunted piñons and cedars.

We passed the town of San Luis and made our next camp about four miles below it on the south bank of the Culebra, near the plaza San Acacia. San Luis is a flourishing-looking Mexican town, sixteen miles from Fort Garland, and is the largest of the series bearing the general name Culebra; it contains about one hundred houses and has a post-office, which, by the way, is also called Culebra. The creek is thinly timbered with cottonwood and bordered with an undergrowth of willows; at this time it was so high as to be unfordable, but was passed by a bridge at San Luis; ordinarily it is readily passable at almost any point. From camp No. 9 we passed down the valley of the Culebra about ten miles, and then rose the bluff to the second terrace, which we found to be a sand-plain, similar in character to the other portions of the San Luis desert. After ten miles of a journey over heavy sand, we reached the Rio Grande, but were unable to cross before the following day, owing to the stormy wind prevailing during the afternoon of our arrival there. The ferry-boat is a dilapidated affair, and it was with considerable difficulty that we were enabled to cross by it at all. Should no other means of crossing the river be provided, it will be practically impassable for teams during at least two months of each spring. At this point there was neither wood nor grass near the river.

On June 10 we crossed the river, but were occupied until noon in the passage; we then marched to a camp on the San Antonio near its junction with the Conejos, and about ten miles from the ferry. Our route as far as the San Antonio lay between lofty hills of a sandstone and lava formation; beyond this we were obliged to follow down the creek to obtain a crossing, as the bridge which once existed here had been swept away.

The valley of the Conejos, which we ascended next day as far as the plaza of Guadalupe, is apparently very fertile, and good crops of cereals and grass are grown; it is well timbered near the banks of the stream by the bitter cottonwood, with the usual accompaniments of willow and alder. The crossing of the San Antonio was difficult, but the crossing of the Conejos would have been found impossible, had it been desirable to cross it. The river (Conejos) had formerly been crossed by a bridge near the plaza of Guadalupe, but this was swept away, a few days before my arrival, by the high water.

The march on the 13th from the San Antonio crossing to Conejos was about ten miles, and we were early in camp. The afternoon was occupied in finding a land-survey corner from which to begin our line, and in the determination of our instrumental coefficients.

The plazas of Conejos are named Guadalupe, Las Pinos, Ciseneroz, San Raphael, San Antonio, Cerritos, Islan, Rincones, and Cordon, the first being the largest and contains the post-office; taken together they comprise a very flourishing Mexican settlement of near 300 houses.

On June 14 we commenced work, and ran our lines up the valley of the Conejos about seven miles and made camp; our road thus far was a good and well-defined one, leading past the plaza San Raphael and a couple of deserted settlements; the valley seemed very fertile, and was for the most part under cultivation. To the south of this valley—here one-half mile in width—is seen a mesa which rises gradually toward the west until it nears the foot-hills of the mountains, where it is broken by an abrupt descent similar to its northern and southern sides. I climbed this mesa with some difficulty, and found its flat top some 300 or 400 yards wide, covered with bowlders of vesicular lava; the valley bordering it on the south is slightly undulating and apparently without water; it is well grown with rank bunch-grass and thickly timbered about its edges with pine, spruce, and cedar. The north slope of the mesa exhibited strata of soft, gray, friable sandstone, alternating with conglomerate.

To the north of Conejos Valley is a similar formation, except as to its top, which, instead of being level and mesa-like, is terminated in two conical peaks, which project 200 or 300 feet above the vertical side-walls.

Next day we followed the beautiful valley of the Conejos for about two miles, and then turned to the hills on its southern bank. These we found for the most part covered with a heavy growth of pine, spruce, and aspen; but along the line of our road the country was open for a further distance of about two and a half miles and well grown with bunch-grass. The Conejos emerges from a narrow and precipitous cañon, whose sides are composed mostly of basalt and vesicular lava, at a point some two miles above where we left its banks. It is here a large and rapid stream, passing over a very rocky bed; its shores are lined with a dense growth of cottonwood and an occasional large pine and cedar. We made some six miles this day, and went into camp in a heavy pine forest near a small stream flowing into the Conejos. Our line continued up this stream nearly two miles, then turned to the north and followed a tributary to its source, and passed over a low divide to the headwaters of a branch of the Los Pinos Creek. A much better road could be built over the first two miles from our camp by following the edge of the hill on the north bank of the stream we first ascended; it was impracticable to run an instrumental line there, owing to the dense entanglement of fallen pines and the thick growth of small aspens about 12 feet high which had sprung up over the ground.

Our camp was made in a beautiful open valley at the foot of a high mesa, whose sides were still covered with snow. This valley is divided by a low ridge, from the north side of which the water flows in an easterly direction into the Conejos, while the water rising to the south of it flows south into the Los Pinos, about three miles distant; this valley was marshy from the melting of the snows above it, and contained several small lakes of beautiful clear water. Bunch and marsh grasses were abundant, and the country seemed well adapted for a summer range for herds of cattle and sheep. Our mules sank into the marsh above the fetlocks, and I found travel disagreeable, and, as I at first thought, dangerous; but I soon discovered that there was a hard stratum some four or five inches below the surface through which there was no fear of penetrating.

In the evening, in company with Mr. Anstey, I walked to the south along a divide for two or three miles and reached a point on the cañon of the Los Pinos of perfect grandeur; the southern face of the cañon has but a slight inclination, while the northern one on which we stood was rather overhanging.

The water here rushed in a perfect torrent 1,200 or 1,500 feet beneath us, between masses of a highly feldspathic granite.

Down this cañon could be seen the distant peak of the San Antonio Mountain, while on its northern bank, and but a mile or two from us, rose jagged peaks to the height of 2,000 feet. On either bank of the Los Pinos River was a range of high mountains showing ledges of volcanic and metamorphic rock; these mountains were covered with a heavy growth of pine, spruce, and aspen timber, which in many places had been killed by forest fires, and their blackened trunks either stood tall and dark against the horizon, or in a fallen position helped form (with the thrifty undergrowth of aspen) an impenetrable entanglement.

The valley of the Los Pinos and the valleys of all its tributaries were covered with a most luxurious growth of bunch-grass, which at this season of the year would support large herds of stock, but the immense snow-fields still remaining in the ravines bespeak a severe winter.

From Camp No. 15 we crossed a level space more than half a mile in width, and there commenced the descent of a long and somewhat steep hill, at the bottom of which ran a small but very rapid stream; this passed, we found ourselves confronted by a high "hog-back," which it was necessary to cross, and the ascent and descent of which were both very difficult; from the foot of the descent we carried the line over the hill again, and up the north bank of the creek. In making a reconnaissance later in the evening, in company with Mr. Anstey, I discovered that a better road could be made by following down this second small stream to near its mouth, and there crossing it; the road should cross the main creek near this point, and follow up its south bank, which is throughout less steep than the northern one.

After leaving Camp 16, we followed the Los Pinos about a mile, and crossed it. We then followed one of its tributaries to its source, which was on the Chama divide.

Where we crossed the Los Pinos it is a stream $3\frac{1}{2}$ feet deep and about 50 feet wide, with a very swift current. It was probably at its highest stage when we saw it, as the snow still lay almost in mass about its headwaters.

Our camp, No. 17, was near a beautiful little lake about an acre in extent, almost hidden by immense pine trees, and surrounded by high snow-banks. On account of our altitude the nights were becoming very cool, and on the 19th day of June we found a thick crust of ice on our

water-bucket at sunrise. The snow-banks, which had given us trouble as we were coming into camp, were so frozen as to allow our train to pass without difficulty next day.

I made a long detour on horseback, to the north of the line between Camps Nos. 16 and 17, to see if a practicable route could not be opened in that direction which would avoid the difficult hills we had met the day previous; but I found the country of the same rugged character as that we had passed, and it became more abrupt and snow-bound the farther north I proceeded. I am satisfied that no practicable road can be made to the north side of our line, as it was with great difficulty that I was enabled to get my horse over it, and for a greater part of the way I was forced to dismount and lead him.

The divide at Camp 17 was very low on the side of the Los Pinos, but the descent to the Chama was quite abrupt. At this point the valley of the Chama is at least two miles wide, and supports a more luxuriant vegetation than any we had yet seen. For about three miles from the point at which we entered it we found very heavy timber, some of the pines measuring more than four feet in diameter, and 200 in height. Below this the valley is open and thickly covered with a heavy growth of bunch-grass. Wild flowers were found in great profusion and beauty. The valley is inclosed on the north by a range of knife-edge hills, back of which this branch of the Chama rises. Their southern faces are composed of a soft, white, disintegrated material, probably lime or feldspar. At the foot of the highest peak is a beautiful little park of about 50 acres extent, containing a small lake of clear water. The south bank rises gradually into the high Chama Mountains, which are timbered to their summits with heavy pines.

About four miles from Camp 18 we crossed the river, but only with considerable difficulty. The banks are about 50 feet high, and very steep, and the stream very rapid. A short distance below this point the Chama receives a large tributary from the west, up the valley of which the snow-covered Navajoe range is visible. The remainder of the valley between this point and our Camp 21, at Los Ojos, is very much like that part of it we had already passed, except that the west bank assumed a mesa-like appearance, and heavy timber, with an undergrowth of scrub-oak, continues down the mountain to the river's edge. Several small streams, running through deep and narrow ravines, must be crossed, but there is an abundance of material at hand, with which they may easily be bridged. The west bank of the river is close under the mesa-wall, and offers no site for a road.

The Tierra Amarilla includes five Mexican plazas, named Hutritas, Ensenada, Los Ojos, Los Brazos, and La Puente. The general name is borne by a section of country near old Fort Lowell, which, under irrigation, produces fair crops of corn and cereals, but stock-raising is the principal industry of the inhabitants. Near the plaza Los Brazos the Chama is formed by what are known as the east and west branches, the former of which rises about a mile south of our Camp 17, and debouches from the Chama range through a very precipitous cañon. The river here is about 80 feet wide, with an average depth of 3 feet, and a very swift current, making the fords at this season of the year very difficult. In ordinary stages of water they offer no obstacle to an easy passage of trains.

From Pierra Amarilla we missed our direction, and ran our line for the first day along the Santa Fé road to the crossing of the Nutrias; to the east of the road runs a high sandstone and conglomerate cliff, forming a divide between the Nutrias and the Nutritas creeks; to the east

is a series of low hills, covered with pine, piñon, and cedar, between which stretch broad plains, producing a heavy growth of sage-brush. Farther up on the side of the mountain are immense fields of scrub-oak and aspen.

From Camp 21 we descended the Nutrias, whose valley for the most part contains indifferent grazing, but very thrifty sage-bush.

The whole of the valley, as far as Camp 22, is composed of a loose drift; here the stream enters a box cañon with soft sandstone walls, the stratification of which is nearly horizontal.

Two routes here presented themselves, the one crossing the Chama about a mile below the mouth of the Nutrias, and the other about three miles above it. Owing to the apparent impracticability of the lower ford, I concluded to cross at the upper one, and accordingly ordered my party to take that direction, and, after crossing, to follow down the valley to the west of the Gallinas Mountains, while I rode on to Fort Wingate to obtain rations and supplies necessary for my escort. I met with some difficulty in getting down the river through a system of narrow and intricate cañons, and when on its banks found it no easy matter to pass the stream in its then high stage.

I did not anticipate that there would be any difficulty in crossing the pack-train at the regular ford, but on my return to the party I learned that one animal had been swept away by the current and only saved with extreme risk to the men, and that two days had been spent in the passage. The river was $3\frac{1}{2}$ feet deep, with rocky or gravelly bottom, but at the ford the gravel gave way and developed a dangerous quicksand underneath. It is probable, however, that this was in some way due to the high state of the water, as teams have passed here without difficulty for years.

While packing the train previous to leaving the camp on the west bank of the Chama, Private John Dougherty, F Company, Third Infantry, was instantly killed by the accidental discharge of a carbine, which had carelessly been left loaded after a hunt the previous evening. He was buried on the west bank of the Chama, at the foot of a high mesa near the lower crossing; his grave was piled with stones to protect it from the wild animals, and its head marked by a rude cross.

After leaving the Chama we passed down a trail made by Major Price, Eighth Cavalry, in the summer of 1872. The road at first ascends an arroya, skirting the base of the Gallinas Mountains; then rises a low divide some ten miles distant from the lower ford. The country near the river is furrowed by numerous deep gullies, and produces little else but sage-brush and cactus. At the divide we entered a valley some thirty-five miles in length and from three to twelve miles in width. This valley is bordered on the east by a range of mounts, through which two small streams, the Gallinas and the Coplin, find their way to the Chama. The north end of the range is called Gallinas, the middle section Copulin, and the south end Jemez. They are all covered with evergreens and aspens to their summits, and their more abrupt faces show strata of various-colored sandstone. Near the plaza of Nacimiento the Jemez Mountains sent far into the valley spurs of low hills, covered with heavy pine and spruce timber. Between these hills are grass-grown meadows, traversed by clear mountain streams, bordered with willows. The first of these streams is the Puerco, which, after reaching the main valley, turns to the south and receives the others as tributaries.

The west of this valley is shut in by a range of sandstone mesas from 100 to 500 feet high, showing, in their vertical sides, shales, conglomerates, clays, and various colored strata of friable sandstone. This forma-

tion extends down the west bank of the Chama to old Fort Lowell, from a point some twenty miles above it; near that fort it leaves the river and follows down to the west of the Puerco as far as the stage-road crossing, where it apparently ends. Its southern face is seen to the north of the road over its whole length to Fort Wingate. This valley is traversed, longitudinally, from its northern extremity to the head of the Puerco by one principal range, a number of smaller ranges of knife-edge hills of peculiar appearance, sometimes rising to a height of 300 feet. They are formed of a soft, light-gray sandstone, with strata having a dip to westward of near 45° .

The west face has a thin covering of soil supporting a growth of evergreens; the east face is nearly vertical, showing the edges of the strata; the bottom is filled with *débris*.

These ranges are in several places broken through by streams which take their rise at the foot of the mesas on the west, and find their way to the Chama. At the time of our passage they were dry, and to all appearances their principal use was to carry off surface-water. The remainder of the valley is gently rolling. The lower hills are covered with evergreens, and the level spaces between them with a rank growth of sage-brush. The flies were so numerous about these small creeks that we were obliged to go into camp nearly a mile from water, and send down our kegs for a night's supply. Many pieces of both painted and unpainted pottery and some stone arrow-heads were found on mounds of drift, among fragments of quartz and petrified wood, but none were to be seen on the higher hills, nor were they to be found in any numbers on the level plain. Near Nacimientto were several large meadows, supporting fine herds of stock; but little of the ground was under cultivation.

I left my party at the crossing of the Chama on June 25, and reached the mail station on the Puerco, distant near 100 miles, next day at 11 a. m. I here took the buck-board and rode to Fort Wingate, where I remained two days, and drew supplies for my escort. I took my supplies with me as far as the Puerco on the buck-board. Here a pack-mule was in waiting to carry them to camp, which was then near the head of the Puerco, some thirty-five or forty miles distant. I reached my camp on July 1, and next day retraced my steps toward Tierra Amarilla, which place was arrived at by my party on July 4. From this point I desired to make a horse-back reconnaissance of a trail leading to Conejos, by way of the east fork of the Chama, but my own horse was too much exhausted to undertake the journey, and I was unable to procure a fresh one. I learned, however, from reliable sources that the trail passing this way, though direct and easily passable for animals, could not be made into a wagon-road on account of the numerous steep hills it crosses and the many rocky ledges over which it leads.

On July 5 we commenced our second line, which connects with our first near the plaza of Las Nutritas, and ran it up the Nutritas about six miles. This stream we found timbered with evergreens for about five miles, when it opens out into a broad expanse covered with scrub-oak. This plane is terminated on the south by an abrupt cliff, disclosing a few badly-preserved cretaceous fossils. The summit of this cliff is the divide between the Nutrias and the Nutritas, and from its highest points a most magnificent view of both valleys and the mesas beyond the Chama is obtained. We found the ascent of the Nutrias gradual and easy, and met with no difficulty until we neared its source, where we entered a heavy forest of pine and aspen, which furnished a serious obstacle to the running of our line.

Camp No. 32 was made on the summit of the Chama range, at the foot of a very high conical peak, composed mostly of lava, trachyte, and pumice. Many beautiful varieties of flowers, among them the columbine, wild tulip, and a brilliant yellow lily, were found here growing at the very edge of the not yet melted snow-banks. Our course now lay down the Vallacita some five or six miles, between ranges of low pine-clad hills. This valley is in some places narrow and closed by heavy timber, but through most of its length is open and covered with rank grasses. We left the main stream at a point where it receives a tributary from the north and another from the east, and turns directly to the south through a rocky gorge. The line here passes over a point of metamorphic rock and ascends the narrow ravine of the eastward branch to an open meadow near its source. This meadow is surrounded by low hills covered with pines and aspens, in the shadows of which banks of snow were still remaining. The small stream which takes its rise here alternately expands into pools several yards wide and contracts to the merest thread of a channel, almost concealed by its grassy banks, meanwhile retaining a depth of a couple of feet or more, and disclosing through its crystal waters a sparkling schistose bottom. The whole region about the headwaters of the Vallicita is broken by bold outcroppings of schistose rock and highly feldspathic granite. After leaving camp 33, we descended a branch of what is known at its source as Las Tusas Creek, but what is known farther down as Petaca. The first mile of our descent was rendered difficult by a dense undergrowth of aspens, and by the marshy condition of the ground, occasioned by the melting snow-banks, the last of which in our course we here passed. Below this thicket the valley opens out into a most fertile pasturage, bordered by timbered hills. The clear stream traversing it is filled with brook-trout. In the evening a large cinnamon bear passed by our camp and entered the woods near it, where he was unsuccessfully pursued by a party of my men.

From Camp 34 we ascended a small branch of the Petaca for about a mile, and then passed over a low divide in an easterly direction to a second branch, which we followed to its source. All this country is gently rolling, and its valleys furnish good grazing to numerous sheep-herds. The highest parts are well timbered with pine, spruce, and cedar, and the banks of the small streams are lined with willows.

To the west of us rose the high snow-crowned mountains we had just crossed, while in our front appeared a mesa towering some 3,000 feet above us. An occasional face of sandstone with horizontal stratification was seen, but most of the country is covered with small boulders of dark, vesicular lava. This formation extends as far as Camp 35, near the headwaters of a small branch of the San Antonio, called Nutrias Creek. The high plain between the Nutrias and the cañon at the head of the Petaca is about four miles in length by three in width, and is dotted with small patches of heavy timber. It is inclosed by the lofty mesa on the east and the still higher mountains on the west, and affords good pasturage to large stock-herds.

The Petaca Cañon, through which we passed, is nearly one-half mile in length and from 20 to 150 feet deep. It is very narrow and its bottom is strewn with lava boulders.

Near the Nutrias we entered an arroya grown with huge pines; this we followed down to the creek, where we made camp in a valley beautifully supplied with fine grass. Next day we followed this creek down about four miles to its mouth, and ascended a steep hill leading to another volcanic mesa, supporting an occasional pine and but little

grass. At the foot of this mesa, on the east, lay the plaza of San Antonio, on the creek of the same name. Here I was obliged to employ a wagon to convey to Fort Garland one of the members of my escort, who had been very ill for several days with dysentery. At Los Pinos we again entered a level and cultivated country; cottonwood trees lined the creek, giving its valley, as seen from the mesa above, an appearance of thrift.

On July 12 we finished our line at the point of beginning, and made camp on the San Antonio River, near its junction with the Conejos. The valley here is very low, and in many places was still wet and boggy. On our arrival here, a month previous, it was entirely submerged. Our route now continued along the Conejos to its mouth. For a greater part of its length, this stream flows through several channels, forming a great number of small islands, most of which are covered with good grass and thrifty cottonwoods. Beyond these islands the country does not differ from the remainder of the San Luis desert in any respect.

In the angle formed by the Conejos and the Rio Grande runs a broken range of abrupt hills and mesas, terminating on the south in the San Antonio Mountain, which is an immense conical peak, rising some 3,500 feet above the general level of the country. It was along this route, and but a few miles from the Rio Grande, that Lieutenant Pike was captured by the Mexicans in the early part of the present century, and taken to Mexico.

Owing to our having taken a wrong road, the Rio Grande was reached at a point some three miles above the ford. Here the meadows on its banks were covered with large pools of water, on which floated hundreds of young ducks and water-fowl; the mosquitoes were so numerous as to be hardly bearable, and gave us more annoyance than they had given us at any previous time on our journey.

The Rio Grande was much lower than when we crossed it before, but still was not down to its summer level. We lightened the packs on our animals and crossed in a very short time without accident, although the water nearly covered the backs of the smaller mules. We followed the valley of the Princhera direct to Fort Garland, where we arrived on July 15. I at once turned over my quartermaster's property, and made application for transportation to Fort Lyon. Next day I was furnished a wagon in which I dispatched my escort, but I was obliged to remain over another day before an ambulance could be placed at my disposal. This same evening I received a copy of a telegram from the assistant adjutant-general Department of Missouri, directing me to return my assistants to Fort Leavenworth at once. I left Fort Garland on July 17, and traveled by the Sangre de Cristo Pass and the Huerfano and Arkansas Valleys to Fort Lyon, which point I reached on the 20th.

I here disbanded my party, the members of the escort returning to their companies, and my assistants to Fort Leavenworth, as directed. In obedience to a telegraphic order of the 21st instant, I left Fort Lyon on the 23d, and arrived on the 24th.

COMPARISON OF ROUTES.

Between Fort Garland and Conejos two routes present themselves; the one by Culebra and Meyer's Ferry is about ten miles the longer, and has a very sandy stretch of eight or ten miles, over which travel will be tedious and difficult. This route presents the further objection of not being so well supplied with wood and grass.

In the one case the Conejos, and in the other the San Antonio, must be passed, and to insure a crossing at all seasons of the year a bridge would be necessary over either. There was a bridge over the Conejos at Guadaloupe, but last spring's freshets carried it away; several of the most responsible citizens of the place informed me that it would in all probability be rebuilt.

The Rio Grande is unfordable for about two months of each year, and there is but little choice in this respect between the two fords. If the river is to be bridged, it may as easily be done at the one place as at the other. The road by way of the Trinchera is hard and level, and in every respect a good passage-way.

From Guadaloupe, by our first line, the road is a good one as long as it remains in the valley of the Conejos; after leaving this valley it rises a hill, on which some work will be required for nearly a mile. The principal labor will consist in removing the surface-stones and leveling the side-slopes. This, I think, can be accomplished by 150 days' work. Some timber would have to be cut on the top of the hill, and a little grading done on the descent, but a few days' labor will complete it all. The crossing of the creek near Camp 14 would be materially improved by a small bridge, which might be readily constructed from timber found on the spot. Beyond this point the way must be cleared for about two miles, of fallen timber and underbrush, for which I would estimate 200 days' work. The next difficulty is between Camps 15 and 16, where the route is at first level and marshy, and afterward passes over a steep hill. I presume the marshy places would give little or no trouble after they had been passed over a few times by wagons, as the paths were more firm than the untrodden ground.

The descent of the first hill could be made without much difficulty by properly winding the road to take advantage of the lightest grades. A bridge at its foot will be necessary for an easy crossing of the creek. The passage of the hill beyond this point can only be made good by continuous grading for nearly a mile; this will require 500 or 600 days' work. The hill is very steep on both slopes, and in some places will give a grade of at least 1 foot in 8. At the bottom of its western slope, about 300 yards of road must be made of stone, along one wall of a narrow gorge, and then carried across a small creek by a bridge; there is at hand, however, plenty of stone and timber for all needs.

Some little siding will require to be made between this point and the head of the Chama, and a bridge or ford must be made across the Los Pinos, and several small bridges across its tributaries; 600 days' work will probably complete this portion of the road.

The descent to the head of the Chama and the passage of the stream at the foot of the hill are the next difficulties to be encountered, except such as may be given by snow. On June 20 there were still large snow-banks on this divide, but none that would obstruct travel on a properly-defined road. The hill here can be passed by careful grading at about one on nine, and the stream may be easily bridged. The side-hill along which our line next passes is broken by high knolls and deep ravines, most of which may be in great part avoided; some work, however, must be done here in the way of grading, and a number of large trees must be cut. The exact amount of work to be done can only be determined after the road receives a definite location.

A bridge must be built over the Chama, at the crossing below Camp 18, and some work will be required on its steep banks. Between here and the plaza of Las Nutritas, about one-half mile of siding must be

made, and some three or four small bridges built over narrow ravines. For a short distance, the way is obstructed with timber, but no difficulty will be experienced in removing it.

In going from Tierra Amarilla to Fort Wingate, three crossings of the Chama are to be chosen between; the upper one is the plaza of La Puente, and has recently been washed out at the side, so as to be entirely impassable. The next one in order is about eight miles farther down the stream, and gave us great trouble on our outward trip by its treacherous bottom. The third is about four miles farther still below, and is difficult to reach on account of high bluffs on both sides the stream. I think the middle one will give the best crossing and the most direct road.

The remainder of the route to Fort Wingate has recently been traveled by wagons, and is, without any work, a very good road.

On our return from Tierra Amarilla to Conejos, we found a good route up the Nutritas to near its head, where one-half mile of grading must be done, and on the first divide timber must be cleared for nearly a mile. In the valley of the Vallicita, a few days' work will be necessary on side-hills and at the creek-crossings.

In passing from the Vallicita to the Patoca a narrow cañon is met, up which a road must be constructed of stone, or a detour must be made over a steep hill requiring deep side-cutting. Plenty of material is convenient for the making of this part of the road.

At the head of the Patoca a narrow ravine, filled with a dense growth of small aspens, is met with, and to construct a good passage-way through it will require two hundred days' work or, perhaps, more. The country is open the balance of the way, except for a short distance in a narrow cañon ascending from the Patoca, where a rocky bottom will give some trouble. A good road can be made, however, up either one of two branches, a choice between which must be made after a careful inspection of both.

The descent to the San Antonio only requires the removal of a few fallen trees and the making of a few yards of grade. In rising from the San Antonio to the high mesa, which ends at Los Pinos, a steep hill is met with, up which a grade of 1 in 8 can be obtained. The descent near the plaza of Los Pinos is about 1 in 6, but is not more than one hundred yards in length. From here to the plaza of Guadalupe the road is good, level, and direct.

RECOMMENDATION.

From Fort Garland to Conejos, I would recommend the road by way of the Trinchera as being the most direct and in every way the best one. From Conejos to Tierra Amarilla, the second route, the one run on our return, is preferable, in that it is less liable to be closed in winter by snow, and it can be made with easier grades and at less expense. Both routes are supplied with wood, water, and grass in the greatest abundance. The distance by the two lines is about the same, unless the second one be turned down the valley of the Nutrias to the middle ford, in which case it would be a few miles the shorter. Materials for bridges exist in abundance at all points where their use is desirable, except on the Rio Grande, where timber must be carted about twenty miles.

If the road be made by the labor of troops, I think a full company can complete it from Fort Garland to the mail-station on the Puerco in three months. This estimate does not include the building of a bridge over

the Rio Grande at the Trinchera, or over either the Conejos, Los Pinos, or Chama. The three latter bridges can be made without great expense.

All of which is respectfully submitted,

GEO. S. ANDERSON,
Second Lieutenant, Sixth Cavalry, in charge of Survey.

Lient. E. H. RUFFNER, *United States Engineers,*
Chief Engineer Department of the Missouri,
Fort Leavenworth, Kans.

GENERAL TABLE.—Survey for direct route from Fort Garland, Colo., to Fort Wingate, N. Mex.

Date.	Stadia distance from Conejos.	Stadia distance from last camp.	Number.	Names.	Latitude.			Longitude.			Soil.	Timber.	Grass.	Water.
					°	'	"	°	'	"				
1874. June 14				Initial point 13 chains west of $\frac{1}{4}$ sec. corner between secs. 19 and 20, T. 33 N., R. 9 E., of the N. N. E. principal meridian.	37	04	45.154	105	51	52.134				
14	2.400			Plaza San Rafael							Near the river the soil is irrigated and cultivated.	Cottonwood along the river; pinon and pine on the bluffs.		
14	6.368		13	Camp on the Rio Conejos.	37	02	27.058	105	58	07.314	Dry and sandy on the upland.	Pine, spruce, aspen, a few cedars; willow and cottonwood in the valley.	Fair.	Good.
15	12.805	6.417	14		37	01	53.077	106	04	28.871	Good.		Good.	Do.
16	17.273	4.468	15	Camp on the Rio Los	37	00	59.375	106	08	18.961	do		Very good.	Do.
17	21.653	4.360	16	Pinos.	36	59	51.095	106	12	50.531	do		Good.	Do.
18	25.833	4.260	17	On divide at head of the Rio Los Pinos.	37	00	37.601	106	16	40.471	do		do	Do.
19	30.496	6.663	18	On the Rio Chama.	36	58	32.496	106	20	18.031	do	Pine, spruce, aspen, willow, and scrub-oak.	Very good.	Do.
20	38.441	7.945	19		36	53	01.517	106	24	42.441	do	Pine, spruce, aspen, willow, and scrub-oak; very fine timber.	do	Do.
21	47.841	9.400		Los Brazos							Soil fair; irrigated in some places.	Pine, scrub-oak, cottonwood, aspen, and willow. The pines are very fine.	do	Do.
22	49.941	11.500		Los Ojos									do	Do.
22	50.377	11.936	20	Camp near Los Ojos, Tierra Amarilla.	36	43	22.773	106	24	50.463			Land near camp is mostly cultivated.	Do.
23	52.577			at 2400, 245, (point of return)	36	42	46.316	106	24	48.591				
				Viñitas	36	36	19.223	106	21	36.220	Soil dry and sandy; fair on the banks of La Nutrias Creek.	Pine, pinon, cedar, and scrub-oaks; willow at the camp.	A little grass among the sugar-bushes.	Fair.

72,165	9,965	106	31	28,314	Indifferent ..	Sage-brush, piñon, and cedar on the bluffs; willow and box-elder on the banks of the creek.	Poor grazing	Do.
76,279	4,181	106	34	44,161	... do	Pinon, cedar, and spruce ..	... do	Good.
92,301		106	41	58,507	Fair	Pine, cedar, piñon, sage-brush.	Good	None.
101,730		106	46	00,822	.. do	... do	Indifferent	Very poor

GENERAL TABLE.—Survey for direct route from Fort Garland, Colo., to Fort Wingate, N. Mex.

Date.	Stadia distance from Station No. 248.	Stadia distance from last camp.	Number.	Names.	Latitude.	Longitude.	Soil.	Timber.	Grass.	Water.
1874.										
July 4	1.300		29	Station No. 248 Near Plaza La Nutritia	36 42 46.318 36 42 04.636	106 24 48.591 106 23 40.990	" Good, (irrigated).	Pine, spruce, and willow	Good, but close cropped by cattle.	Good.
5	1.650	0.350	30	Plaza La Nutritia La Nutritia Creek	36 38 29.813 36 38 02.347	106 30 14.567 106 16 42.534	Good do	Pine, aspen, scrub-oak, cottonwood, and willow.	Good	Good.
6	11.002	3.881	31	Near the divide	36 38 21.814	106 11 51.860	do	Pine, aspen, willow, and scrub-oak.	do	Do.
7	15.867	4.895	32		36 42 27.884	106 05 19.739	do	Pine, spruce, aspen, and willow.	do	Do.
8	24.207	8.320	33		36 43 47.053	106 01 49.281	do	do	do	Do.
9	28.276	5.069	34	Station No. 141, Las Tuleas Creek.	36 48 49.899	106 02 34.856	do	Spruce, pine, aspen, cottonwood, and willow.	do	Do.
10	34.835	6.539	35	On La Nutritia Creek	36 58 30.509	105 55 04.901	Arid.	Cottonwood and willow along the banks of the creek.	Poor	Do.
11	43.259	13.424	36	On Los Pinos Creek					do	Do.
12	55.641	7.393		Initial point of survey	37 04 17.919	105 52 58.804	do		do	Do.

EXTRADITION TREATY WITH GREAT BRITAIN.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RESPONSE TO

A resolution of the House of Representatives adopted March 30, 1876, in relation to the case of Ezra D. Winslow, and the accompanying papers.

JUNE 10, 1876.—Referred to the Committee on Foreign Affairs and ordered to be printed.

To the House of Representatives :

I transmit herewith, in answer to the resolution of the House of Representatives of the 30th day of March last, a report from the Secretary of State, with accompanying papers, which presents the correspondence and condition of the question up to the day of its date.

U. S. GRANT.

WASHINGTON, June 10, 1876.

DEPARTMENT OF STATE,
Washington, June 10, 1876.

The Secretary of State has the honor to report that upon the 31st day of March, ultimo, he received a copy of a resolution of the House of Representatives in the following words:

Resolved, That the Committee on Foreign Affairs be instructed to inquire if there be any conflict of construction between the government of Great Britain and the United States in reference to the extradition treaty of 1842, and whether any, and, if any, what, legislation is proper by Congress to remove any difficulties, if such exist, in the execution of said treaty. And the committee is authorized to call upon the Secretary of State for all recent correspondence touching the subject of this inquiry.

In the month of February, 1876, one Ezra D. Winslow, charged with extensive forgeries and the utterance of forged paper, committed within the jurisdiction of the United States, being found in Great Britain, was apprehended, pursuant to the terms of the tenth article of the treaty of August 9, 1842.

Thereafter the evidence of the criminality of the fugitive was heard, and being sufficient, he was duly committed, for extradition, upon the 3d of March, ultimo, in the city of London.

The requisition for his surrender was duly made on the part of the Government of the United States, and every requirement of the treaty was complied with; nevertheless the government of Great Britain has declined to surrender the fugitive, unless the Government of the United States would give certain stipulations or make certain guarantees, not contemplated or provided for by the treaty between the two governments.

In addition to Winslow, there are two other fugitive criminals in London, charged with forgery and the uttering of forged paper, for whom demand has been made, and who have also been duly committed for extradition pursuant to the treaty, but whom the government of Great Britain in like manner declines to deliver up.

The application for the discharge of Winslow and Brent has been adjourned to June 15. In the case of Gray, the time for his detention has not expired. The correspondence called for by the resolution of the House of Representatives, up to the present date, with certain accompanying papers and documents, is herewith respectfully submitted, and will show the points in difference between the two governments with regard to their respective rights and duties under the extradition clause of the treaty of 1842.

Respectfully submitted.

HAMILTON FISH.

To the PRESIDENT.

List of papers.

- Mr. Fish to General Schenck, February 12, 1876.
- General Schenck to Mr. Fish, February 15, 1876.
- Mr. Fish to General Schenck, February 17, 1876.
- Same to same, No. 845, February 17, 1876.
- Same to same, No. 849, February 21, 1876.
- General Schenck to Mr. Fish, March 2, 1876.
- Mr. Fish to General Schenck, March 3, 1876.
- General Schenck to Mr. Fish, No. 884, March 2, 1876.
- Mr. Hoffman to Mr. Fish, No. 36, March 4, 1876.
- Same to same, No. 39, March 10, 1876.
- Mr. Fish to Mr. Hoffman, No. 864, March 31, 1876.
- Same to same, April 5, 1876.
- Mr. Hoffman to Mr. Fish, No. 61, April 8, 1876.
- Same to same, April 13, 1876.
- Same to same, No. 62, April 13, 1876.
- Mr. Fish to Mr. Hoffman, No. 874, April 21, 1876.
- Mr. Hoffman to Mr. Fish, April 27, 1876.
- Mr. Fish to Mr. Hoffman, April 28, 1876.
- Memorandum of a conversation between Sir Edward Thornton and Mr. Fish, April 30, 1876.
- Mr. Hoffman to Mr. Fish, May 1, 1876.
- Mr. Fish to Mr. Hoffman, May 2, 1876.
- Mr. Hoffman to Mr. Fish, May 2, 1876.
- Same to same, May 3, 1876.
- Same to same, No. 76, May 4, 1876.
- Same to same, No. 79, May 6, 1876.
- Same to same, No. 82, May 11, 1876.
- Same to same, May 12, 1876.
- Same to same, No. 84, May 13, 1876.
- Same to same, May 20, 1876.
- Mr. Fish to Mr. Hoffman, May 20, 1876.
- Mr. Hoffman to Mr. Fish, May 22, 1876.
- Mr. Fish to Mr. Hoffman, No. 887, May 22, 1876.
- Same to same, No. 890, May 24, 1876.
- Mr. Hoffman to Mr. Fish, No. 95, May 25, 1876.
- Same to same, May 26, 1876.

Mr. Fish to Mr. Hoffman, May 27, 1876.

Memorandum of a conversation between Mr. Fish and Sir Edward Thornton, May 27, 1876.

Mr. Hoffman to Mr. Fish, May 28, 1876.

Mr. Fish to Mr. Hoffman, May 28, 1876.

Mr. Hoffman to Mr. Fish, No. 99, May 27, 1876.

Mr. Hoffman to Mr. Fish, June 1, 1876.

Same to same, June 6, 1876.

Same to same, June 9, 1876.

Mr. Fish to Mr. Hoffman, No. 897, June 9, 1876.

Appendix.

Extract from proceedings of court of Queen's Bench, November 21, 1876.

Extract from report of judgment rendered by supreme court of Canada, 1874.

Mr. Dart to Mr. Cadwalader, No. 345, April 7, 1876.

Same to same, No. 348, April 18, 1876.

Same to same, No. 350, April 25, 1876.

Opinion of the Attorney-General of the United States upon the petition of Charles L. Lawrence, July 16, 1876.

Extract from proceedings of United States circuit court for the southern district of New York, in the case of Charles L. Lawrence, May 27, 1876.

Mr. Fish to General Schenck.

[Telegram.]

WASHINGTON, February 12, 1876.

E. D. Winslow, charged with large forgeries, escaped by steamer Rotterdam, under name of Clifton, and is said to be in London. Obtain arrest if possible, and advise Department promptly.

FISH,
Secretary.

General Schenck to Mr. Fish.

[Telegram.]

LONDON, February 15, 1876.

Winslow arrested. Send charge with proof at once.

SCHENCK.

Mr. Fish to General Schenck.

[Telegram.]

WASHINGTON, February 17, 1876.

Officer, with papers for Winslow's extradition, sails Saturday.

FISH,
Secretary.

Mr. Fish to General Schenck.

No. 845.]

DEPARTMENT OF STATE,
Washington, February 17, 1876.

SIR: Information of a trustworthy character having reached this Department that one Ezra D. Winslow, charged with the commission of

the crime of forgery in the State of Massachusetts, is now under arrest in London, awaiting extradition, I have to request you, pursuant to the provision of the tenth article of the treaty of 1842, between the United States and Great Britain, to make application to the proper authorities for the delivery of said Winslow into the custody of Mr. Albion P. Dearborn, who is duly authorized to receive the criminal, and to bring him back to the United States for trial.

Mr. Dearborn, who is provided with the necessary papers in the case, sails at once for London, and will present himself at the legation.

I am, &c.,

HAMILTON FISH.

Mr. Fish to General Schenck.

No. 849.]

DEPARTMENT OF STATE,
Washington, February 21, 1876.

SIR: A conversation occurred on the 17th instant, between Sir Edward Thornton and myself, in reference to the course which might be adopted by the British government on a demand being preferred for the extradition of Winslow on the charge of forgery.

Sir Edward suggested that if his surrender were requested it might be refused unless a stipulation was entered into that the fugitive should not be tried upon any offense other than that for which he was extradited.

Whether this course, if adopted, grows out of the proceedings in the Lawrence case, or from a desire to make the extradition treaty between the United States and Great Britain subject to the provisions of the British extradition act of August 9, 1870, I cannot say.

You will remember that this act in section 3, under the head of "Restrictions on Surrenders of Criminals," provides that no criminal shall be surrendered unless provision is made by the law of the foreign state, or by arrangement, that the fugitive shall not be tried for any offense "other than the extradition crime proved by the facts on which the surrender is grounded."

If the course adverted to be caused by the Lawrence case, it may be well to say that it is believed that Lawrence has not, up to this time, been arraigned for any other than the extradition offense, and that no representation has been made to this Government on the question.

If such a course is taken for any other reason, it may be said that Great Britain has on more than one occasion tried surrendered criminals on offenses other than those for which they were extradited, and such trials afford a practical construction of the scope of the treaty and of the power and rights of either Government as understood and applied by Great Britain for a period of nearly thirty years after the ratification thereof; and I cannot imagine that it will be claimed by Great Britain that either party to a treaty may at will, and by its own municipal legislation, limit or change the rights which have been conceded to the other by treaty, and have been practically admitted for such length of time.

I would also call your attention to the twenty-seventh section of the act of 1870, (ch. 52, 33, 34 Vict.) repealing former acts under which extradition had theretofore been made; this section expressly excepts everything contained in the act inconsistent with the treaties referred to in the repealed acts, among which is the treaty with the United States. It seems to have been clearly the intent of Parliament not to

apply to that treaty any of the provisions of the act inconsistent with the treaty, as it had existed and been enforced for nearly thirty years.

While I hope that no such demand will be made as intimated, you will object to any such stipulation being asked, and, should it be insisted upon, you will decline to give it, and, if necessary, telegraph to the Department for further instructions.

I am, &c., &c.,

HAMILTON FISH.

General Schenck to Mr. Fish.

[Telegram.]

LONDON, March 2, 1876.

Lord Derby calls attention to third clause, subsection two, of extradition act, and declines to give up Winslow unless promise is made by law or by arrangement that he shall be tried only for the extradition crime.

SCHENCK.

Mr. Fish to General Schenck.

[Telegram.]

WASHINGTON, March 3, 1876.

The treaty of extradition between the United States and Great Britain admits no right in either party to exact conditions beyond those expressed in the treaty. The promise now asked in regard to Winslow is not in accordance with the treaty, and cannot be given. You will request the surrender of the fugitive on the terms of the treaty.

FISH,
Secretary.

General Schenck to Mr. Fish.

No. 884.]

LEGATION OF THE UNITED STATES,
London, March 2, 1876.

SIR: Referring to your dispatch No. 845, and to my telegram of this date, I have the honor to inclose to you a copy of a note I have received from Lord Derby upon the subject of the surrender of Winslow.

Before receiving this note, though subsequent to its date, I had applied in the usual form for the surrender of the accused. Winslow was brought before the sitting magistrate to-day, the necessary proofs and papers were put in, and the prisoner was remanded till to-morrow to await notice from the foreign office that his surrender had been demanded by the United States Government.

I have, &c., &c.,

ROBT. C. SCHENCK.

[Inclosure 1 in 884.]

FOREIGN OFFICE, February 29, 1876.

SIR: I have the honor to state to you, that I have been informed by Her Majesty's secretary of state for the home department, that the chief magistrate of the Bow

street police-court issued, on the 13th instant, upon the information of Colonel Chesebrough, of the United States legation, warrants for the apprehension, under the 8th section, clause second of the extradition act, 1870, of Ezra D. Winslow, who is accused of the crime of forgery within the jurisdiction of the United States of America.

Her Majesty's secretary of state for the home department, in communicating this to me, has drawn my attention to the third clause subsection 2 of the act, which is as follows :

"A fugitive criminal shall not be surrendered to a foreign state unless provision is made by the law of that state, or by arrangement, that the fugitive criminal shall not, until he has been restored, or had an opportunity of returning to Her Majesty's dominions, be detained or tried in that foreign state for any offense committed prior to his surrender, other than the extradition crime proved by the facts on which the surrender is grounded."

And has inquired whether any provision has been made by the law of the United States or by arrangement that Winslow, if surrendered, shall not, until he has been restored or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the United States for any offense committed prior to his surrender other than the extradition crime proved by the facts on which the surrender is grounded.

The secretary of state for the home department fears that the claim advanced by your Government to try Lawrence in the recent case of extradition, with which you are familiar, for crimes other than the extradition crime for which he was surrendered, amounts to a denial that any such law exists in the United States; while the disclaimer by your Government of any implied understanding existing with Her Majesty's government in this respect, and the interpretation put upon the act of Congress of August 12, 1842, chapter 147, section 3, preclude any longer the belief in the existence of an effective arrangement, which Her Majesty's government had previously supposed to be practically in force.

The secretary of state for the home department is accordingly compelled to state that, if he is correct in considering that no such law exists, he would have no power, in the absence of an arrangement, to order the extradition of Winslow, even though the extradition crime for which he has been arrested were proved against him, and the usual committal by the magistrate ensued thereupon.

I have thought it right to lose as little time as possible in calling your attention to the intimation which I have thus received from Her Majesty's secretary of state for the home department; and I have the honor to request that you will bring the circumstances to the knowledge of your government, in order that means may be found for the solution of the present difficulty.

I have the honor, &c.,

DERBY.

Mr. Hoffman to Mr. Fish.

No. 36.]

LEGATION OF THE UNITED STATES,
London, March 4, 1876. (Received March 20.)

SIR: Referring to your dispatch No. 845, I have the honor to inform you that Winslow was committed for extradition on the 3d instant, on the several charges of forgery, and on the several charges of uttering forged paper, as set forth in the indictment. Colonel Chesebrough, who has had this matter in charge, has taken great pains to see that the mistake made by the solicitor employed in the Lawrence case should not be repeated.

In this connection I have to acknowledge your telegram of yesterday and to say that I shall at once address a note to Lord Derby in pursuance of your instructions.

I have, &c.,

WICKHAM HOFFMAN.

Mr. Hoffman to Mr. Fish.

No. 39.]

LEGATION OF THE UNITED STATES,
London, March 10, 1876. (Received March 24.)

SIR: Referring to your dispatch No. 849, in relation to the extradition of Winslow, I have the honor to inclose to you herewith a copy of a note

which I received last evening from Lord Derby, dated March 8, and also a copy of a note which I addressed to him upon the same day. Having reason to believe that Her Majesty's government are determined to adhere to the position taken by them, and refuse to give up Winslow, unless a law or arrangement is made that he shall be tried only for the extradition crime, upon the ground that the extradition act of 1870 leaves them no choice in the matter, I addressed my argument, as you will observe, principally, to show that the act does not apply to the treaty, and I referred especially to the 27th section, (ch. 52, 33, 34,) to which you called my attention.

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure 1 in No. 39.]

Lord Derby to Colonel Hoffman..

FOREIGN OFFICE,

March 8, 1876. (Received March 9, 1876.)

SIR: I referred to Her Majesty's secretary of state for the home department General Schenck's notes of the 1st and 2d instant, applying for the surrender to the United States officer authorized to receive him, of Ezra D. Winslow, charged with having committed certain crimes within the jurisdiction of the United States of America; and I have the honor to inform you that, the requisite proof having been laid before him, the chief magistrate of the Bow street police-court has formally committed Winslow to prison, and Mr. Cross has forwarded to Sir Thomas Henry his order, under section 8 of the extradition act, 1870, signifying that a requisition has been made for the surrender of the prisoner.

The chief magistrate will, upon the committal being completed, forward to Mr. Cross a certificate of such committal, together with his report upon the case, and nothing would, in the ordinary course of things, remain but for Her Majesty's secretary of state for the home department, at the expiration of the fifteen days prescribed in the eleventh section of the act of 1870, to issue his warrant for Winslow to be surrendered to the person duly authorized to receive him. But, in view of the difficulty created in consequence of what has recently occurred in the case of Lawrence, as well as the positive enactment of section 3, subsection 2, of the extradition act of 1870, quoted in the second paragraph of my note to General Schenck of the 29th ultimo, Her Majesty's government do not feel themselves justified in authorizing the surrender of Winslow until they shall have received the assurance of your Government that this person shall not, until he has been restored or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the United States for any offense committed prior to his surrender other than the extradition crimes proved by the facts on which the surrender would be grounded; and I have the honor to request that you will communicate this decision to your Government, in order that some arrangement may be come to in the matter.

I have, &c.,

DERBY.

[Inclosure 2 in No. 39.]

Mr. Hoffman to Lord Derby.

LEGATION OF THE UNITED STATES,

London, March 8, 1876.

MY LORD: Referring to your note to General Schenck of February 29, upon the subject of the extradition of Winslow, in which you state that the secretary of state for the home department may come to the conclusion that he has no power to surrender the fugitive, even though the usual committal by the magistrate should take place, I have the honor to inform you that I have received a communication from my Government upon this subject. Mr. Fish states, not having then received a copy of your lordship's note, but only a telegram from General Schenck, that he is at a loss to understand upon what ground the possible action of Her Majesty's government, as foreshadowed in that communication, is based.

If it is founded on a desire to make the extradition treaty of 1842 between the United States and Great Britain subject to the extradition act of 1870, he is unable to find anything in that treaty which admits the right of either party to exact conditions beyond those expressed in the treaty. If, on the other hand, it is based, as I infer from your lordship's note, upon the reported action of my Government in the Lawrence case, I am authorized by Mr. Fish to say that at the date of his dispatch Lawrence had not been arraigned for any other crime than the extradition crime, and that no representation had been made to my Government upon this subject. In your lordship's note you refer to the clause of the act of 1870, which forbids the surrender of a fugitive criminal, unless provision is made by law, or by arrangement, that he shall be tried only for the extradition crime proved by the facts upon which the surrender is granted. But may I be permitted to call your lordship's attention to the 27th section of the same act, (ch. 52, 33 and 34 Vict.,) repealing the former acts under which extradition had theretofore been accorded?

This section, probably suggested by the foreign office, excepts everything contained in the act inconsistent with the treaties referred to in the repealed acts, among which treaties is that with the United States. And I am enabled to call your lordship's attention to a case in the court of the Queen's Bench, *ex parte Bouvier*, in which it was argued by the attorney-general, in reference to this section, that the intention of Parliament was to make a general act which should apply to all cases, except when there was anything inconsistent with the treaties referred to, and that the provision limiting the crime for which the trial might be had, being inconsistent with the treaty, the condition so imposed did not apply to the treaty, and the lord chief-justice (Cockburn) further observed, "I rather hesitate to express a decided opinion as to the construction to be put upon the 27th section, although I see plainly what was the intention of the legislature; that is to say, it was intended, while getting rid of the statutes by which the treaties were confirmed, to save the existing treaties in their full integrity and force." The "full integrity and force" of the treaty of extradition between the United States and Great Britain has been clearly shown and settled by an unbroken operation of nearly thirty years, during which time Great Britain has, at least upon one occasion, tried surrendered criminals for crimes other than those for which they have been surrendered, and has thus afforded a practical construction of the scope of the treaty, and of the powers and rights of both governments. I sincerely hope that Her Majesty's government, upon a further consideration of this matter, will be able to hold, with that eminent jurist, the lord chief-justice, that the desire of the legislature to save the treaties in "their full integrity and force" has been effected, and that they will decide, as he states that he should have done, had it been necessary, "that this object has been accomplished." I know that Her Majesty's government is as anxious as we are that criminals should not escape the just punishment of their crimes, by taking refuge on a foreign shore; and it would assuredly be a sad thing for the interest of both countries, and in that of humanity, if a treaty which has worked so well for nearly thirty-five years, to our mutual advantage and to the furtherance of justice, should now be permitted to fall to the ground, and great criminals, on both sides of the Atlantic, be thus enabled to escape "unwhipt of justice."

I have, &c.,

WICKHAM HOFFMAN.

Mr. Fish to Mr. Hoffman.

No. 864.]

DEPARTMENT OF STATE,
Washington, March 31, 1876.

WICKHAM HOFFMAN, Esq., &c.,

SIR: Referring to previous correspondence in reference to the extradition of Winslow, in custody in London, I have now to acknowledge the receipt of your No. 39, under date of March 10, inclosing a note addressed to you by Lord Derby, of March 8th and your reply of the same day.

With General Schenck's No. 884 was inclosed a note from Lord Derby, dated February 29th, in which it was stated that Her Majesty's secretary of state for the home department had drawn attention to subsection two of the third section of the British extradition act of 1870, and feared that the claim by this Government of the right to try Lawrence, (who had been recently surrendered,) for crimes other than that for

which he had been extradited, amounts to a denial that any such law as is referred to in the British act exists, and the disclaimer of this Government of the existence of any implied understanding in respect to trials for crimes other than extradition crimes, together with the interpretation put upon the act of Congress of August 12, 1842, (which is doubtless an error for 1848,) preclude any longer the belief in the existence of an effective arrangement which Her Majesty's government had previously supposed to be practically in force, and it was added that the secretary of the home department was compelled to state that if he were correct in considering that no such law exists, he would have no power, in the absence of an arrangement, to order the extradition of Winslow, even although proper proceedings had been taken for that purpose.

Lord Derby called General Schenck's attention to the intimation which he had received from the home department, and requested that the matter be brought to the knowledge of this Government.

It is to be remarked, however, that in this note the foreign office, as distinguished from the home office, expressed no opinion on the question involved, but confined itself to requesting that the views of the home office might be communicated to this Government.

A few days later, however, on the 8th of March, Lord Derby assumes the more advanced position previously occupied only by the home department, and writes as follows: "Her Majesty's government do not feel themselves justified in authorizing the surrender of Winslow until they shall have received the assurance of your Government that this person shall not, until he has been restored, or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the United States for any offense committed prior to his surrender other than the extradition crimes proved by the facts on which the surrender would be grounded," and requesting that this decision be communicated to this Government.

To his note you made reply under date of March 8, referring to the general practice for many years under the treaty, and calling attention to the construction given to the twenty-seventh section of the act of 1870 in the case of Bouvier.

No further correspondence has reached this Government, and the matter rests upon this note of Lord Derby and your reply.

The reasons given by Lord Derby for the course intimated in his note, arise, as he states, from what had taken place in this country in the Lawrence case, and the positive terms of section three, subsection two, of the British extradition act of 1870.

Moreover, it has been stated that the home office had even gone further, and expressed the opinion that, not only had some implied understanding been reached as to the particular crime for which Lawrence should be tried, but that it would be in violation of the law of the United States, and of the general laws of extradition of all countries, to try any prisoner for any other crime than the particular extradition offense for which he had been surrendered.

With regard to any such understanding, either expressed or implied by any authorized declaration or engagement of this Government, no evidence is adduced; none can be adduced. This Government asked the surrender of Lawrence, precisely as it has asked the surrender of all other fugitives who have been delivered by Great Britain under the treaty of 1842, complying on its part with the requirements of the treaty; and neither by expression nor by implication, entering into any "arrangement;" but simply requiring the fugitive to be "delivered up to justice." It furnished such evidence of criminality, as according to the laws of

Great Britain, where the fugitive was found, would have justified his apprehension and commitment for trial, if the crime or offense had been there committed.

Great Britain recognized the compliance by this Government with all that the treaty required, and delivered the fugitive up to justice.

The allusion made by the home office to the case of Lawrence needs possibly a passing remark.

Charles L. Lawrence is charged with a series of forgeries whereby the Government of the United States claims to have been defrauded to an amount not far short of two millions of dollars on custom-house entries. He is supposed to have numerous and influential confederates, both in this country and in England, who are suspected of having shared in the spoils resulting from these alleged frauds upon this Government.

A large number of indictments have been found against Lawrence, and proceedings either civil or criminal are either pending or imminent against supposed accomplices. It is supposed that prosecution of these cases might possibly disclose names on either side of the Atlantic, in connection with the alleged frauds, not yet brought before the public.

In the spring of 1875 Lawrence fled and escaped to Europe, and was arrested, under the assumed name of Gordon, at Queenstown, on a requisition for his surrender under the treaty. There were proved (as I am informed) before Sir Thomas Henry, in London, twelve or thirteen distinct charges of forgery, each on papers connected with a different invoice of goods. The representatives of this Government supposed the extradition was made on all the charges; but the letter or report of Sir Thomas Henry to the British home office led to the issue of a warrant of surrender of Lawrence on the single charge of forging a bond and affidavit, on which warrant the keeper of the jail delivered Lawrence to the agent appointed by the President to receive him; the terms of the warrant were not known to any agent or officer of this Government (as is represented to me) until long after Lawrence's return to the United States. His counsel and friends appear to have been apprised of the fact, that although proof was presented on some twelve or thirteen charges of forgery, the warrant of surrender seems to be confined to the forging a bond and affidavit. Up to this date Lawrence has been arraigned only upon one indictment, based on the forgery of the bond and affidavit mentioned in Sir Thomas Henry's report to the home office, and he has not been arraigned for any offense other than the extradition crimes proved by the facts in evidence before Sir Thomas Henry, and on which his surrender was based.

Although not arraigned on any other indictment than for the forgery for which he was extradited, the British home office has raised the question that he may possibly be tried upon other charges and for other crimes.

It seems, therefore, that the home office of Great Britain undertakes to decide what is the law of the United States as well as of Great Britain, and assumes that the law of the United States, as well as general law of extradition and the extradition act of Great Britain, prevents the trial of a criminal surrendered under the treaty of 1842 for any offense other than the particular offense for which he was extradited; and the position which it takes involves the assumption that, in demanding an extradition under the treaty, the United States is bound by the provisions of the act of 1870, whether in conflict with the treaty or not, and it claims to have "supposed" that an "effective arrangement was in force," that no criminal so surrendered should be tried

for any other than the particular extradition offense; on the faith of which arrangement it is claimed that surrenders have heretofore been made, and without which it is now said that a surrender would not be possible under an English act; but as already said nothing is adduced in support of the belief of the existence of such supposed arrangement.

These positions are so different from the understanding of this Government, and so opposed to the views which it was supposed were entertained by Great Britain, and which have been recorded in parliamentary papers, which have been asserted in diplomatic correspondence, and been recognized in judicial decisions in that as in this country, and set forth by writers on extradition law, that I learn from Lord Derby's note, with surprise equal to my regret, that they appear to be supported by the foreign office.

The act of August 12, 1848, reproduced in the Revised Statutes, (sections 5270 to 5276,) referred to in the correspondence, does not affect or limit the rights of the two governments on the question.

This act is simply a general act for carrying into effect treaties of extradition. It provides the machinery, and prescribes the general mode of procedure, but does not assume to determine the rights of the United States, or of any other state, which are governed wholly by the particular provisions of the several treaties, nor to limit or construe any particular treaty.

In some few treaties between the United States and foreign countries, provisions exist that the criminal shall not be tried for offenses committed prior to extradition, other than the extradition crime, and in others no such provision is included.

Again, under some treaties, the citizens or subjects of the contracting powers are reciprocally exempt from being surrendered, while others contain no such exception. The United States act of 1848 is equally applicable to all these differing treaties. If the surrendered fugitive is to find immunity from trial for other than the offense named in the warrant of extradition, he must find such immunity guaranteed to him by the terms of the treaty, not in the act of Congress. The treaties which contain the immunity from trial for other offenses have been celebrated since the date of the act of 1848.

At that date the United States had treaties of extradition only with Great Britain and with France, neither of which contained the limitation referred to.

The terms of the respective treaties alone define or can limit the rights of the contracting parties.

The construction of the treaty between the United States and Great Britain, by the two Governments, and their practice in its enforcement for many years were in entire harmony. In each country surrendered fugitives have been tried for other offenses than those for which they had been delivered; the rule having been that, where the criminal was reclaimed in good faith, and the proceeding was not an excuse or pretense to bring him within the jurisdiction of the court, it was no violation of the treaty, or of good faith, to proceed against him on other charges than the particular one on which he had been surrendered. The judicial decisions of both countries affirm this rule. It was so held in a case of inter-state extradition by Judge Nelson, in *Williams vs. Bacon*, 10 Wendell, 636, and the same principle was laid down by the court of appeals of New York, in a late case of *Adrian vs. Lagrave*, who had been delivered up under the treaty with France. In *United States vs. Caldwell*, (8 Blatchford Cir. Ct. Rp., 131,) Caldwell, after ex-

tradition from Canada for forgery in 1871, was indicted for bribing an officer; and the plea was entered that the prisoner was brought within the jurisdiction of the court upon a charge of forgery, under the treaty, and that the offense specified in the indictment was not mentioned in the treaty. A demurrer being interposed, the court decided the prisoner had been extradited in good faith, charged with the commission of a crime, and must be tried.

In the case of Burley, extradited from Canada on a charge of robbery, the prisoner was tried on assault with intent to kill.

In the case of Hielbronn, who was extradited from this country for forgery, and tried in Great Britain for larceny, the facts, as stated by the solicitor-general of Great Britain who had charge of the proceedings, and who was examined before the late British commission on the extradition question, were, that the prisoner being extradited for forgery, was acquitted, and was thereupon tried and convicted for larceny, an offense for which he could not have been surrendered, not being enumerated in the list of crimes mentioned in the treaty.

In Canada there is the same current of authority.

In the case of Von Earnam, (Upper Canada Reports 4 C., p. 288,) the prisoner was surrendered by the United States to Canada upon the charge of forgery, and application was made for release on bail on the ground that the offense was, at most, the obtaining of money under false pretences and not within the treaty. Macauley, C. J., said, in denying the motion, that he was disposed to regard the offense as forgery, but even if the offense were only false pretences, after "being in custody, he is liable to be prosecuted for any offense which the facts may support."

In Paxton's case, (10 Lower Canada Jurist, 212, 11, 352,) the prisoner was charged with uttering a forged promissory note. He pleaded that he had been extradited upon the charge of forgery, and could not be tried for uttering forged paper, or for any other than the extradition offense. The court decided that the trial should proceed. The prisoner thereupon protested against being called upon to plead to any other charge than that for which he was extradited, but he was tried, found guilty, and the conviction affirmed on appeal.

In addition to the foregoing, Judge Benedict, in his opinion in Lawrence's case, delivered within a few days past, entirely coincides in these views, and the Solicitor-General of the United States, in his opinion in Lawrence's case, dated July 16, 1875, reaches the same conclusions.

An examination of the report of the select committee on extradition of the House of Commons, which sat in 1868, under whose superintendence the extradition law of 1870 was framed, and which was composed of some of the most distinguished public men of Great Britain, among whom were the solicitor-general, Mr. Mill, Mr. Forster, Sir Robert Collier, and Mr. Bouverie, shows that the law of the United States, and the practice in regard to extradition, were perfectly well understood, and they are distinctly referred to on several occasions.

Mr. Hammond, now Lord Hammond, for many years under-secretary of state, in speaking of Burley's case, stated, that as it was suggested that the prisoner, who had been surrendered on a charge of robbery, was about to be tried for piracy, the matter had been referred to the law-officers of the crown, and that it was held that if the United States put him *bona-fide* on his trial for the offense for which he was extradited, it would be difficult to question their right to try him for piracy, or any other offense of which he might be accused, whether such offense was or was not a ground of extradition, or even within the treaty; and

added, "We admit in this country that if a man is *bona-fide* tried for an offense for which he was given up, there is nothing to prevent his being subsequently tried for another offense, either antecedently committed or not." (Answer 1036.)

Mr. Mullens, an eminent member of the bar, who was counsel in the Lawrence case, in reply to a question of Sir Robert Collier, said that, in his opinion, a surrendered criminal ought to be tried for an offense other than the extradition offense arising from the same facts: and Mr. Foster, (question 1214,) considering the propriety of the proposed stipulation, that a person should be tried for no offense other than the extradition offense, said :

The Americans do not make that stipulation, or else you would not have been able to try Hielbronn for another offense. To which Mr. Mullens responded: "No; there is no stipulation of that kind in the case of America."

Mr. Mill thereupon said, (question 1216:)

"As I understand it, the treaty with America would not prevent our trying a man for a different offense from that for which he had been given up." To which Mr. Mullens replied: "It would not; there is no stipulation that he shall not be tried for any other offense." Then follows question 1217, "Would you wish to extend that state of things to other countries?" and the reply "with regard to America, I have never found any difficulty about it," &c.

So far as can be ascertained there was absolutely no dissent at any time from these views as to the law and practice under the treaty, and the only question seemed to be whether it was wise to attempt to change them.

Mr. Clark, (an eminent British authority,) in his Treatise on Extradition, says :

It is quite clear that neither the treaty nor the law of the United States contains the provisions of the extradition act of 1870.

It would appear, therefore, by the judicial decisions, by the practice of both governments, and by the understanding of the persons most familiar with proceedings in such cases, and the most competent to judge, that where a criminal has been in good faith extradited for an offense within the treaty, there is no agreement, express or implied, that he may not also be tried for another offense of which he is charged, although not an extradition offense. He is, in fact, (in accordance with the language of the treaty,) "delivered up to justice;" and in the absence of any limitation by treaty, to "justice" generally; each independent state being the judge of its own administration of justice. Surely, Great Britain will not allow the legislature of another state to prescribe, or to limit the cases, or the manner in which justice is to be administered in her courts, and she will not expect the United States to be less tenacious of its independence in this regard.

Now, for the first time since the signing of the treaty of 1842, Great Britain raises the question of her right to demand from the United States, as a condition of the execution by Great Britain of her engagement to surrender a fugitive criminal charged with a series of stupendous forgeries, a stipulation or agreement not provided for in the treaty, but asked on the ground that an act of Parliament, passed some twenty-eight years after the treaty had been in force, prescribes it as one of the rules or conditions which should apply to arrangements for extradition, when made with a foreign state.

This involves the question whether one of the parties to a treaty can change and alter its terms or construction or attach new conditions to its execution without the assent of the other—whether an act of the Parliament of Great Britain, passed in the year 1870, can change the

spirit or terms of a treaty with the United States of nearly thirty years anterior date, or can attach a new condition, to be demanded of the United States before compliance by Her Majesty's government with the terms of the treaty, as they have been shown to have been uniformly understood, and executed by both governments, for the third of a century.

As this Government does not recognize any efficacy in a British statute to alter or modify, or to attach new conditions to the executory parts of a previously-existing treaty between the United States and Great Britain, I do not feel called upon to examine particularly the provision of the law of 1870. But inasmuch as Great Britain seeks to impose the provisions of that act upon the United States in the execution of a treaty of many years' anterior date, I do not fail to observe that, while by the act Great Britain assumes to require that no surrendered fugitive shall be tried in the country which demands his extradition for "any offense other than the extradition crime," (in the singular,) proved by the facts on which the surrender is grounded, she reserves to herself the right to try the fugitive surrendered to her for such crimes (in the plural) as may be proved by the facts on which the surrender is grounded.

This does not seem to be wholly reciprocal, and if the United States were disposed to enter into a treaty under this act, it might expect some greater equality of right than a cursory examination of this provision in the act seems to provide.

It is quite well known that after the passage of the act of 1870 an effort was made to enter into a treaty with Great Britain which should enlarge the number of extradition offenses, and otherwise extend the provisions of the existing treaty.

At the outset it was apparent that the act of 1870 was not an act to carry into effect treaties or conventions for extradition, as is the United States act of 1848, but one providing a system to which all subsequent treaties of extradition must be adapted, and which could be applied to enforce treaties or arrangements made subject to its provisions.

This Government was unable to agree to any arrangement based on the provisions of the act of 1870, and in a note addressed to Sir Edward Thornton, the British minister, under date of January 27, 1871, he was informed that "this Government understands the twenty-seventh section of the extradition act of 1870 as giving continued effect to the existing engagements for the surrender of criminals. Imperfect as they are, in view of the long continuous frontier between British North America and the United States, we must be content to suffer the inconvenience, until Parliament shall put it in the power of Her Majesty's government to propose a more comprehensive and acceptable arrangement."

The British government was thus distinctly and formally advised of the position and of the views of the United States, and no exception thereto has been expressed.

A further effort to effect a treaty was made in 1873, after the passage by the British Parliament of an act amending the act of 1870, which resulted in failure, for precisely similar reasons.

This failure to negotiate a new treaty arose solely because the United States could not accept as part of it some of the provisions of the act of 1870, and preferred to go on under the treaty of 1842, as theretofore construed, and practically carried into effect by each government; and thus we have proceeded up to the present time.

In support of the construction which this Government in 1871, in the note to Sir Edward Thornton above referred to, gave to the twenty-seventh section of the extradition act, it appears that when the Court

of Queen's Bench was called to pass upon the very question, in the case of *Bouvier*, 27 *Law Times*, N. S., 844, the attorney-general stated that the intention had been to make a general act, which should apply to all cases except where there was anything inconsistent with the treaties referred to. So far as the point was passed on, the lord chief-justice expressed the opinion that it was the intention, while getting rid of the statutes by which the former treaties were carried out, at the same time to save those treaties in their full integrity and force, and that the result had been accomplished. One of the other justices thought the question somewhat doubtful, and the third agreed with the chief justice.

The Solicitor-General of the United States, in his opinion in *Lawrence's case*, given in August of last year, reached the same conclusion, that the treaty was not affected by the act.

It cannot readily be believed that Parliament intended by the act of 1870 to claim the right to alter treaties in existence without notice to the other government, or to impose new conditions upon foreign governments seeking extraditions under treaties in existence prior to that act.

The United States has declined to become subject to the British act of 1870, and with knowledge of this the government of Great Britain has continued constantly to ask and obtain extraditions under the treaty of 1842, and since the refusal of the United States to negotiate a new treaty under the provisions of that act.

Since the passage of the act of 1870 Great Britain has obtained from this Government some thirteen warrants of extradition, and has instituted a much larger number of proceedings to obtain extradition. In no instance has Great Britain thought it necessary to tender any such stipulation as she now asks from the United States, or to present her requests for extradition in any way different from that in which they were presented prior to 1870. The United States in the same time have instituted numerous proceedings, and at this moment have three criminals in London in custody upon charges of forgery, whose extradition this Government is seeking in the usual manner provided by the treaty.

During this period no intimation has reached this Government that the treaty of 1842 was not in full force, or that the act of 1870 was claimed to limit its operation, or to impose upon this Government the necessity either of changing its laws, or of giving stipulations not known to the provisions of the treaty, and not heretofore suggested, nor has any representation been made to this Government, by that of Great Britain, on account of any proceedings taken in the case of *Lawrence*, mentioned in the opinion attributed to the home office, in the note of Lord Derby to General Schenck, before referred to.

But now, with three important cases pending in London at the present time for extradition, in one of which, at least, all the formalities have been complied with, we are informed in substance that it had been supposed up to the present time by the British home office that our law as to trials for other than extradition offenses was in agreement with the law of 1870; but finding it to be otherwise, we are confronted with the requirement of a stipulation in order to obtain what is guaranteed by the treaty of 1842, whereby the United States must recognize the right of the British Parliament, by statute, to change existing executory treaties, and to impose upon this Government conditions and stipulations to which it had not given its assent.

As relates to the particular case of the fugitive Winslow, there is not, so far as I am aware, any intention of trying him for any offenses other

than those on which indictments were transmitted, and for which his surrender was demanded; but the United States will give no stipulation of which the treaty does not authorize the demand.

As the stipulation or condition is demanded by Great Britain as a right, the right of the demand must be established.

The President regrets that a condition which, in his judgment, is without any justification under the treaty, should have been asked. He regards the question thus presented as of a grave and serious character, on the final solution of which must probably depend the continuance of the extradition article of the treaty of 1842. He cannot recognize the right of any other power to change at its pleasure, and without the assent of the United States, the terms and conditions of an executory agreement in a treaty solemnly ratified between the United States and that power. He thinks that the twenty-seventh section of the British act of 1870 was specially intended to exempt the treaty with the United States from the application of any of the new conditions or provisions embodied in that act, and to leave that treaty to be construed, and the surrender of fugitives thereunder to be made, as had been previously done.

He hopes that, on a further consideration, Her Majesty's Government will see, in the section referred to, the effect which he supposes it was designed to have.

But he recognizes that it is for the British government to construe and enforce its own statutes; and should Her Majesty's government finally conclude that the British Parliament has attached a new condition to the compliance by that government of its engagement with the United States under the tenth article of the treaty of 1842, relating to extradition, requiring from the United States stipulations not provided for or contemplated in the treaty, he will deeply regret the necessity which will thereby be imposed upon him, and does not see how he can avoid regarding the refusal by Great Britain to adhere to the provisions of the treaty as they have been reciprocally understood and construed from its date to the present time, or the exaction by that government of a condition heretofore unknown, as the infraction and termination of that provision of the treaty.

You are not authorized to enter into any stipulation or understanding as to the trial of Winslow, in case he be delivered up to justice. His surrender is asked under and in accordance with the provisions of the tenth article of the treaty between the United States and Great Britain of the 9th of August, 1842. He is charged with a crime included within the list of crimes enumerated in the treaty; that crime was committed within the jurisdiction of the United States, and he has sought an asylum and been found within the territories of Great Britain, and the United States have produced such evidence of his criminality as, according to the laws of Great Britain, would justify his apprehension and commitment for trial if the crime or offense had been committed in Great Britain.

You will communicate the substance of this to Lord Derby, and should he desire it, you may read it him.

I am, sir, your obedient servant,

HAMILTON FISH.

Mr. Fish to Mr. Hoffman.

[Telegram.]

WASHINGTON, April 5, 1876.

HOFFMAN,
Chargé, London:

* * * * *

A full reply to your thirty-nine is on the way. It may be advisable to receive it before question is decided; especially if adverse.

FISH, *Secretary.*

Mr. Hoffman to Mr. Fish.

No. 61.]

LEGATION OF THE UNITED STATES,
London, April 8, 1876. (Received April 20.)

SIR: Referring to previous correspondence upon the same subject, I have the honor to inform you that Winslow has not yet been surrendered to the United States; neither have I as yet received an answer to my note of Lord Derby of March 8. On receipt of your telegram day before yesterday, I called upon Lord Tenterden, who, in the absence of Lord Derby, is in charge of the foreign office, and told him that further instructions in the case of Winslow were on the way to me, which I should probably be able to communicate to him early next week. He said that he would so inform the home office.

I have, &c.,

WICKHAM HOFFMAN.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, April 13, 1876.

FISH, *Secretary, Washington:*

Lord Derby asks if district court has power to try Lawrence for crimes not named in warrant? If so, withdraws proposal for arrangement. Sees no remedy except in act of Congress. Proposes to renew negotiations for new treaty. States that Winslow must be released May second. Copy note sent to-day.

HOFFMAN,
Chargé.

Mr. Hoffman to Mr. Fish.

No. 62.]

LEGATION OF THE UNITED STATES,
London, April 13, 1876. (Received April 25.)

SIR: I have the honor to inclose to you a copy of a note which I received this morning from Lord Derby.

His lordship refers to a telegram from New York which appeared in the Daily News of the 29th ultimo, and which he has ascertained from Her Majesty's legation at Washington to be substantially true, to the effect that the United States district court for the southern district of

H. Ex. 173—2

New York had decided that the forger Lawrence can be tried for other crimes than those mentioned in the warrant, and inquires whether the district court at New York has the power to carry out this decision.

In case that it has such power, Lord Derby thinks that it would be nugatory to enter into such an arrangement as he proposed in his note of the 8th ultimo, and sees no solution of the present difficulty except through an act of Congress.

Lord Derby further requests me to express to you the hope of Her Majesty's government that the negotiation of a new treaty of extradition, which may be beneficial to the interests of both nations, may be renewed as soon as possible, and in conclusion calls my attention to the twelfth section of the act of 1870, to the effect that a fugitive cannot be detained in custody beyond two months from the date of his commitment, unless the Secretary of State can show sufficient cause for further detention, and adds that, therefore, however much Her Majesty's government may regret not being able to comply with the wishes of the Government of the United States, they will be unable to detain him in custody beyond that specified time.

The two months expire on the 2d proximo.

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure with No. 62.]

Lord Derby to Colonel Hoffman.

FOREIGN OFFICE, April 11, 1876.

SIR: With reference to previous correspondence respecting the extradition of Ezra D. Winslow, and especially to the letter I had the honor of addressing to you on the 8th ultimo, in which I stated to you, for the information of the United States Government, that Her Majesty's government would not feel themselves justified in authorizing the surrender of that prisoner until they should have received the assurance of your Government that he should not, until he has been restored or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the United States for any offense committed prior to his surrender, other than the extradition crimes proved by the facts on which the surrender would be grounded, I have now the honor to call your attention to the inclosed copy of a telegram which appeared in the Daily News, of the 29th ultimo, and which I have ascertained from Her Majesty's legation at Washington to be substantially correct; and to request that you will be good enough to ascertain from your Government, for the information of Her Majesty's government, whether the district court at New York has the power to carry out the decision it is reported to have arrived at, viz, that the forger Lawrence, who was surrendered to the United States Government under the 10th article of the treaty of 1842, can be tried for other offenses besides those mentioned in the warrant.

In this country the Attorney-General would enter a *nolle prosequi*, and so put a stop to further proceedings in any prosecution; but Her Majesty's government are not aware whether the Attorney-General of the United States has similar powers. The reported language of the district court leads them to think that he has not.

If so, it would, in the opinion of Her Majesty's government, be nugatory to enter into an arrangement such as I had the honor of proposing in my letter to you of the 8th of March, above alluded to; and Her Majesty's government see no solution of the present difficulty but the passing of an act of Congress which, while recognizing the acknowledged principle of international law that a fugitive can only be tried for the crime or crimes for which he was surrendered, will enable the Government of the United States to guarantee that the condition, which Her Majesty's government are compelled to require under section 3, subsection 2, of the act of 1870, will be complied with.

With regard to future difficulties which may possibly arise on the general subject of extradition, Her Majesty's government can see but one satisfactory solution, namely, the conclusion of a more comprehensive treaty between the two countries, and one more suited to the requirements of the day than the existing arrangement.

I have, therefore, to request that you will express to your Government the hope of Her Majesty's government that the negotiation of a treaty which will be so beneficial to the interests of the two nations may be renewed as soon as possible.

In conclusion, I have the honor to remind you that, under the provisions of the twelfth section of the extradition act of 1870, a fugitive cannot be detained in custody longer than two months from the date of his committal, unless the Secretary of State can show sufficient cause for further detention; and that, therefore, however much they may regret being unable to comply with the wishes of your Government respecting the surrender of Winslow, they will be unable to detain him in custody beyond that specified time.

I have, &c.,

DERBY.

[Daily News, March 29.]

NEW YORK, Tuesday, 28th.

The United States district court of New York has decided that the forger, Lawrence, who was brought from England under the extradition treaty, can be tried for other offenses besides those mentioned in the warrant. The court cannot regard the order of the President to the contrary, or take notice of any agreement between the English and American Governments to that effect.

Mr. Fish to Mr. Hoffman.

No. 874.]

DEPARTMENT OF STATE.

Washington, April 21, 1876.

SIR: Referring to my instructions, No. 864, of the 31st ultimo, as to the case of Winslow, whose extradition has been demanded by the United States under the treaty of 1842, I have to state that two cases in which the Canadian authorities have been called upon to pass upon the very point now under consideration, have come to the notice of the Department, one of which has occurred since that instruction was addressed to you. Of these it seems proper that you should be informed in connection with the general question.

I inclose a memorandum in relation to the case of Rosenbaum, who was extradited from Canada in 1874, and an extract from a dispatch received to-day from Mr. Dart, the consul-general of the United States in Canada, stating the conclusions to which the Canadian authorities have arrived in the case of Charles Worms, who has been delivered up within a very few days past upon a demand made on February 21, 1876.

The Department has not had an opportunity of examining the opinions in these cases, but you will perceive that the conclusions reached appear to fully agree with the position taken by this Government.

Should the question be still open, it would seem that the decisions in these cases should be brought to the attention of the government of Great Britain.

I am, &c.,

HAMILTON FISH.

[Inclosures.]

1. Memorandum in the case of Rosenbaum.
2. Extract. Mr. Dart to Mr. Cadwalader, April 18, 1876, No. 348. (See page 56.)

[Inclosure 1, in No. 874.]

Memorandum.

In the case of Rosenbaum, whose extradition was asked from Canada, January 14, 1874, on a charge of arson, and the warrant for whom was issued in January, 1874, the question that the British act of 1870 applied was raised and discussed, as well as the

general question of the right to try an offender for any offense other than the extradition crime. The court examined this ground assumed by the prisoner's counsel, and reference was made to the arguments and judgment in the previous case of *Bouvier* in the Queen's Bench. The prisoner was committed for extradition, and, in so doing, Ramsay, J., said: "Notwithstanding the plausibility of this reasoning, it fails to convince me. In the first place it goes too far, for if it were recognized as a principle of international law that a prisoner extradited could only be tried for the crime for which the extradition took place, it would not have been necessary for the Imperial Parliament to make these provisions, and it would not be necessary to ask this question. I am not, however, aware that it has ever been laid down in England that a man once within the jurisdiction of English courts could set up the form of his arrest, or the mode by which he came into custody, as a reason for his discharge when accused of a crime. But even were this otherwise, it is not the international law that it is sought to prove, but the special requirement of a new statute. Now, I cannot conceive how a new provision of the act of 1870 could be consistent with the treaties with France, the United States, and Denmark entered into years before."

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, April 27, 1876.

FISH, *Secretary, Washington:*

If Winslow gets before Queen's Bench on *habeas corpus*, am I to employ counsel? Shall not intervene unless instructed.

HOFFMAN, *Chargé:*

Mr. Fish to Mr. Hoffman.

[Telegram.]

WASHINGTON, April 28, 1876.

HOFFMAN, *Chargé, London:*

Counsel on *habeas corpus* seems impracticable in present condition of the case. You will present to Lord Derby copy of eight sixty-four, with a note referring to your previous oral communication thereof, and stating that you do so under instructions, in a final hope of still preserving the treaty, and in the further hope that he may see therein sufficient cause to prevent the discharge of Winslow, and to order his surrender under the tenth article of the treaty of eighteen forty-two, in accordance with the requisition of this Government.

You will further state, in substance, that although the United States does not recognize the statute of eighteen seventy as controlling extradition under our treaty, still, as Great Britain claims to be governed thereby, you hope that his lordship will see in the twelfth section authority for his intervention to cause the surrender in accordance with the treaty.

FISH, *Secretary.*

Memorandum of a conversation between Sir Edicard Thornton and Mr. Fish, April 30.

Sir Edward Thornton states that the British Cabinet in regular meeting yesterday, (April 29,) have had under consideration the extradition case of Winslow; and that Lord Derby instructed him to say that he

regretted that they had been obliged to adhere to the opinion previously expressed in his notes to the United States *chargé*, and that Winslow would be discharged on Wednesday next unless the Government of the United States would give assurance that he should not be tried for any offense other than that on which the extradition should be made.

Mr. Fish expressed regret at this decision, and explained to Sir Edward Thornton that the charges against Winslow were for offenses against State laws, and the indictments against him were found in the courts of the State of Massachusetts, not in the Federal courts; and that, without regard to any question of policy, or of right to ask any stipulation or assurance, the President could not restrain the jurisdiction of the courts of any one of the States over offenses against the law of that State, and, therefore, he could not enter into any promise or assurance restricting the power of a State to try a criminal within its jurisdiction for any crime for which he may have been indicted in that State.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, May 1, 1876.

FISH, *Secretary, Washington:*

Informed by foreign office Winslow will be discharged on third, unless arrangement made. Reply to note promised in few days. Have asked he may be detained till answer received and communicated to you. Meantime matter will come up in Parliament.

Copy eight sixty-four sent Lord Derby Saturday, with note.

HOFFMAN.

Mr. Fish to Mr. Hoffman.

DEPARTMENT OF STATE,
Washington, May 2, 1876.

HOFFMAN, *Chargé, London:*

You were not instructed or authorized to make the request stated in your telegram of first.

FISH,
Secretary.

[Telegram.]

Mr. Hoffman to Mr. Fish.

LONDON, May 2, 1876.

Winslow applies for *habeas corpus* to-morrow. British government will oppose his immediate release. Shall not intervene unless instructed. Papers asked for in House of Commons; refused for the present.

HOFFMAN.

[Telegram.]

Mr. Hoffman to Mr. Fish.

LONDON, May 3, 1876.

Winslow applied for discharge. Attorney-general opposed. Case adjourned ten days.

HOFFMAN.

Mr. Hoffman to Mr. Fish.

No. 76.]

LEGATION OF THE UNITED STATES,
London, May 4, 1876. (Received May 15.)

SIR: I have the honor to inclose to you copies of all important correspondence which has passed between the British government and this legation on the subject of the extradition of Winslow, since the 20th ultimo.

* * * * *

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure No. 1 with No. 76.]

Mr. Hoffman to Lord Derby.

LEGATION OF THE UNITED STATES,
London, April 29, 1876.

My LORD: Referring to my note of the 20th instant, I have the honor to inclose to you herewith, under the instructions of Mr. Fish, a copy of his dispatch of March 31, upon which my note was based.

I beg to assure your lordship that both Mr. Fish and I understand and appreciate the sad circumstances which have prevented your lordship from receiving me, with a view to my reading to you the dispatch of Mr. Fish.

In forwarding this dispatch, I am instructed to say that it is done in the hope of still preserving the treaty, and with the further hope that your lordship will find therein sufficient cause to prevent the discharge of Winslow, and to order his surrender under the 10th article of the treaty of 1842, and in accordance with the requisition of the United States. I am further instructed to say that, while my Government cannot recognize the act of eighteen hundred and seventy as controlling extradition under the treaty, still, as Her Majesty's government claims to be bound thereby, Mr. Fish hopes that your lordship will see in the 12th section of that act authority for your intervention to cause the surrender of Winslow in accordance with the treaty.

I have, &c.,

WICKMAN HOFFMAN.

The right honorable the EARL OF DERBY, &c., &c., &c.

[Inclosure No. 2 in No. 76.]

Lord Derby to Mr. Hoffman.

FOREIGN OFFICE,
April 27, 1876.

SIR: With reference to your note of the 20th instant, I have the honor to state to you that the question of the extradition of Winslow and of the other two persons now in custody, on the requisition of the United States Government, has been again considered by Her Majesty's government, and that they have come to the conclusion that it will not be in their power to surrender the prisoners unless an assurance is given by the United States Government that they will not be tried in the United States for any offense committed prior to their surrender, other than the extradition crimes proved by the facts on which the surrender would be granted.

The period allowed by law for the detention of Winslow expires on the 3d of May, and for that of Brent and Gray on the 23th of May and 21st of June respectively, and they cannot be detained after those dates unless good cause can be shown by Her Majesty's secretary of state for the home department for their further detention.

I shall have the honor of sending a detailed answer to your note in a few days, but I have thought it right to inform you at once of the decision of Her Majesty's government, in order that you may have time to communicate with your Government before the release of the prisoner Winslow.

I have the honor, &c.,

DERBY.

[Inclosure No. 3 in No. 76.]

Mr. Hoffman to Lord Derby.

LEGATION OF THE UNITED STATES,
London, May 1, 1876.

MY LORD: Referring to your note of the 11th of April, and to mine of the 20th, I have the honor to request that your lordship will take such steps as shall lead to the detention of the fugitive Winslow in custody until I shall have received your lordship's answer to my note, and have had time to communicate it to Mr. Fish, and to receive his instructions in reply.

I make this request in the interest of justice, and with the earnest hope that means may be found of settling the question unfortunately in dispute between our two governments, and of thus preserving the treaty, and avoiding the turning of great criminals loose upon society to recommence their career of crime.

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure No. 4 with No. 76.]

Immediate.

FOREIGN OFFICE, *May 1, 1876.*

SIR: I have the honor to acknowledge the receipt of your note of this day's date, requesting that steps may be taken for the detention of the fugitive Winslow in custody for a further period; and I beg leave to state to you, in reply, that I have referred your note to Her Majesty's secretary of state for the home department.

I have, &c.,

TENTERDEN,

In the absence of the Earl of Derby.

[Inclosure No. 5 with No. 76.]

Pressing.

FOREIGN OFFICE, *May 2, 1876.*

SIR: With reference to my letter of yesterday, I have the honor to inclose for your information a copy of a notice, just received from the home office, which has been addressed to that department by Messrs. Wontner & Sons, solicitors, stating that an application will be made to-morrow at twelve o'clock to a judge at chambers for the issue of a writ of *habeas corpus* in this case of E. D. Winslow.

In forwarding this notice, the secretary of state for the home department has informed me that he will endeavor to show cause why the prisoner should not be set at liberty, but that he is unable to guarantee the result.

I have, &c.,

TENTERDEN,

In the absence of the Earl of Derby.

(Copy.)

IN THE HIGH COURT OF JUSTICE,
QUEEN'S BENCH DIVISION.

In the matter of Ezra D. Winslow, a prisoner in the house of detention under the extradition warrant of commitment.

We hereby give you notice that we shall to-morrow, at 12 o'clock, apply to a judge at chambers, by counsel, for an order for the discharge of the above-named Ezra Dyer Winslow, or for a writ of *habeas corpus* directing the governor of the House of Deten.

tion, Clerkenwell, in the county of Middlesex, to bring up the body of Ezra Dyer Winslow, in order that he may be discharged from custody, he having been in custody under an extradition warrant of committal since 3d March last.

Dated this 2d day of May, 1876.

Yours, &c.,

WONTNER & SONS,

3 Cloak Lane, Canada Street, Solicitors for the said Ezra Dyer Winslow.

[Inclosure No. 6 in No. 76]

Lord Derby to Mr. ———.

FOREIGN OFFICE, May 3, 1876.

SIR: With reference to my letter of yesterday's date, I have the honor to inform you that an application was made this morning before Baron Pollock by Winslow's solicitor for his release, but that, on a statement from Her Majesty's attorney-general that negotiations on the subject were going on between Her Majesty's government and the United States Government, the judge remanded the case for ten days.

I have, &c.,

DERBY.

[Inclosure No. 7 in No. 76.]

Mr. Hoffman to Lord Derby.

LEGATION OF THE UNITED STATES,

London, May 3, 1876.

MY LORD: Referring to our correspondence upon the subject of Winslow, and especially to my note of the 20th instant, I have the honor to call your lordship's attention to two recent decisions in Canada, which have been sent me by Mr. Fish, with instructions to communicate them to you.

Your lordship will perceive that the conclusions reached by the Canadian courts in both cases appear fully to agree with the position taken by the United States Government in this matter.

I have, &c.,

WICKHAM HOFFMAN.

Mr. Hoffman to Mr. Fish.

No. 79.]

LEGATION OF THE UNITED STATES,

London, May 6, 1876. (Received May 17.)

SIR: Referring to previous correspondence upon the subject of Winslow, I have the honor to forward to you herewith a copy of a note I received last evening from Lord Derby.

I have, &c.,

WICKHAM HOFFMAN.

[NOTE.—As instruction No. 864, of March 31, had been delivered to Lord Derby and a request made that it be substituted for a note addressed to him by Mr. Hoffman communicating it, this is taken as a reply to 864.]

[Inclosure in No. 79.]

Lord Derby to Mr. Hoffman.

FOREIGN OFFICE, May 4, 1876.

SIR: I had the honor of informing you in my note of the 29th ultimo that Her Majesty's government having again considered the question of the extradition of Winslow, and of the other two persons in custody on the requisition of the United States Government, had come to the conclusion that it would not be in their power to surrender them unless an assurance were given by the United States Government that they would not be tried for any offense other than the extradition crimes on which the surrender would be

granted, and that the prisoners could not be kept in confinement beyond the dates fixed by law for their detention.

I shall have the honor in the present note of informing you of the grounds on which this conclusion was based, and I will first consider the present position of the question as represented in the latter part of your note of the 20th ultimo, in which you state that "in 1842 a treaty for the surrender of fugitive criminals was made between the United States and Great Britain. Under it for nearly thirty years fugitives were delivered up on both sides, and tried for crimes not named in the warrant by either party, without remonstrance from the other."

While assenting to the first part of this paragraph, Her Majesty's government take exception to the second, and assert that there is no case within the knowledge of this government in which a prisoner was surrendered by England for one offense and tried by the United States for a different one.

The case of Heilbrunn, where it is alleged that a prisoner was surrendered by the United States for one offense and tried for a different one here, was a private prosecution, and no evidence can be found of the attention of the Government having been called to it.

As far, moreover, as the language of the statutes in both countries passed for the purpose of giving effect to the treaty of 1842 is concerned, it shows that though that treaty contained no express stipulations on the question of the trial of persons surrendered under it for crimes other than the extradition crimes of which they were accused before the surrendering authorities, the secretaries of state in either country were only empowered to deliver up extradition prisoners to be tried for the crime for which they had been accused in the country delivering. (See 6 and 7 Victoria, c. 76, 3, and act of Congress August, 1848, chap. 147, s. 3.)

Her Majesty's government cannot assent to the proposition that the English extradition act of 1870 imposed a new condition upon the treaty of 1842. They maintain that if that act had never been passed, it would have been the duty of Her Majesty's government, under the act of 6 and 7 Victoria, cap. 76, upon which the treaty then rested, and the general law of extradition, to have protested against any extradition prisoner being tried in the United States for crimes other than those of which he was accused in this country, and had that protest been disregarded by the Government of the United States, the British government would have been equally bound to require an assurance in any subsequent case that a prisoner would only be tried for the crime or crimes for which he was surrendered.

And while dealing with this part of the case, I would ask how the United States Government is prepared to reconcile the views expressed in your note in favor of the assertion of the right of asylum for political offenses with the principle you have been instructed to advocate.

There is no principle of international law more clearly admitted than that advanced by you that each state is judge of its own administration of justice, and with regard to the right of asylum for political offenses, it is clear that the nation surrendering is to be the judge of what is or is not a political offense, the more so because opinions differ in different countries on this question.

But if the principle contended for in your note be correct, what is to prevent the United States Government from claiming a prisoner from this government for an extradition crime and trying him afterward for an offense which in this country would be deemed a political offense, but which in the United States might be viewed under a different aspect?

Her Majesty's government believe that the only test and the only safeguard for the liberty of the individual and the maintenance of the right of asylum are to be found in the principle for which they contend, that the crime or crimes of which a man is accused in the country surrendering, which are proved against him there, and for which he is surrendered, are the only crimes for which he ought to be tried in the country claiming, and that without this safeguard the liberties of the subject and citizens of the two nations might be jeopardized and put into the power of political parties or of the vindictiveness of the receiving government, who, *ex concessis*, is not the proper judge of whether a particular offense is a political one or not. And here I must observe, with reference to your comment on the words "deliver up to justice," that if those words can be construed as having the extended meaning for which you contend, namely "deliver up to justice generally," there would be no object in having a list of extradition crimes for which alone an accused person can be claimed, and the construction would be in direct opposition to the act of Congress of August, 1848, chap. 147, sec. 3, and 6 and 7 Vict., chap. 76, sec. 3, "to be tried for the crime for which he is so accused," the word being identical in both acts.

I now proceed to consider the effect of the extradition act of 1870, and I will state at once that Her Majesty's government do not contend that any of the provisions of that act have any force or effect in any foreign state.

They look upon that act only as declaratory of the law that is to govern the British government in the matters to which it refers, and they consider that none of its provisions are inconsistent with the treaty of 1842, section 27.

It is to be regarded as intended to prevent for the future the evils that were pointed out by Mr. Hammond and others, as having occurred, and being liable to occur in private prosecutions to which the attention of government had not been called.

Her Majesty's government consider the provisions of the act as having been devised, not in the particular interests or for the particular ends of Great Britain, but as the embodiment of what was the general opinion of all countries on the subject of extradition, and as being beneficial to all and injurious to none.

That the general opinion of European nations has justified this view is proved by the acceptance, by most of the leading nations of Europe, of extradition treaties based upon its provisions.

The attention of the United States Government was drawn to the provisions of the act immediately after it became law, as is shown by Sir E. Thornton's communication to Mr. Fish of the 23d of September, 1870; and it is evident that Mr. Fish's notice was called to the effect of the restrictions of clause 3, subsection 2, from the question which he shortly afterward put to Sir E. Thornton, whether it would be possible that a stipulation could be inserted in any new convention, that if, during the trial of a person whose extradition had been asked for on a minor crime, such as larceny, evidence previously unknown should appear that a prisoner had been guilty of a higher crime, such as murder, it should be legal to try him for the latter crime. To this question Sir E. Thornton, by instruction from Her Majesty's government, returned the following answer in writing:

"That any provision in the treaty, by which a fugitive surrendered for one offense mentioned in the schedule may be tried for any offense committed prior to his surrender, other than the extradition crime for which he was surrendered, would be inadmissible. Indeed the treaty, if it is to be carried out, must contain a provision exactly to the opposite effect."

The draught of a new convention between the two countries was afterward prepared, and article VI of that draught, as it originally stood, was as follows:

"When any person shall have been surrendered by either of the high contracting parties to the other, such person shall not, until he has been restored or had an opportunity of returning to the country from whence he was surrendered, be triable or tried for any offense committed in the other country prior to the surrender other than the particular offense on account of which he was surrendered."

Although much discussion took place on different provisions of this draught convention, and considerable alterations and modifications of the original draught were proposed by the United States Government and adopted by the British government, not one word of objection was ever raised by the United States Government to article VI.

The only proposal made by them with reference to the article was the addition, at the end of it, of the words "No person shall be deemed to have had an opportunity of returning to the country whence he was surrendered until two months at least shall have elapsed after he shall have been set at liberty and free to return," which was assented to by the British government. The terms of that convention were, in fact, with one exception, virtually agreed upon by both governments; that exception was a difference which arose upon article VII relating to political offenses.

The original article was to the effect that "No accused or convicted person should be surrendered if the offense in respect of which his surrender is demanded shall be deemed by the party upon whom the demand is made to be of a political character, or if he prove to the satisfaction [of the police magistrate, or of the police judge, or commissioners named in article III of this treaty, or of the court before whom he is brought on habeas corpus, or] of the Secretary of State, that the requisition for his surrender has, in fact, been made with a view to try or to punish him for an offense of a political character."

The United States Government proposed to leave out the words between brackets, and thus restrict the power of deciding as to what was a political offense to the Secretary of State alone.

To this the British government could not agree, as the effect would have been to deprive an accused of his right to *habeas corpus*; to take away from him the power of proving at once his right to be set at liberty and of taking the objection in the first instance before the tribunal before whom he was brought immediately on his arrest.

This would be contrary to the spirit of English law, entirely apart from the extradition act of 1870; would have been a direct blow to the liberties of persons claiming asylum in this country; would put it in the power of a Secretary of State to keep an accused person in prison who ought to have been set at liberty at once, and who ought to have the opportunity given him of claiming his right to be set at liberty at the very first moment that he was charged before any tribunal.

It was for these reasons that the British government declined to accede to the proposal; and, if the rights of an accused, which were well known and established in this country long before the extradition act was passed, are secured to him, there is not, as far as Her Majesty's government are aware, any other matter of difference between the two governments which would prevent that convention being signed at the present moment.

It does not, therefore, appear how, in any respect, the act of 1870 erected an insurmountable barrier in the way of a convention, as alleged in your note.

It appears, therefore, that the provisions of the extradition act of 1870 and the powers of the British government under it having thus been clearly brought to the notice of the United States Government, both countries continued, without any question, mutually to surrender persons accused of crimes within the treaty of 1842.

No case arose in either country, to the knowledge of the British government, in which any departure was made from the usual practice, and no prisoner was ever, to the knowledge of the British government, tried for any offense other than that of which he had been accused in the country surrendering.

Her Majesty's government, therefore, contend that they and their predecessors were justified in considering that, by the tacit and implied consent of each country, this practice would be continued, and that it was not necessary to ask for any positive arrangement to secure that object.

So convinced was the secretary of state for the home department that this was the case, that, when in the first instance his attention was drawn to the intention to try Lawrence for smuggling by the solicitors who had acted for him in this country, the reply given to them was, that the Secretary of State could not assume that the Government of the United States, in the face of their general understanding and in view of their act of Congress of August 12, 1848, chapter 147, section 3, would ever think of acting in a manner so contrary to their own law and to the general law of extradition in all countries as to try an extradition prisoner for any other crimes than the extradition crime of which he had been accused in the country which delivered him up.

On the 9th of December, Sir E. Thornton informed Mr. Fish that, as the question had been raised in Lawrence's case, it might be difficult for the British government to surrender criminals hereafter, unless Her Majesty's government was assured by that of the United States, that the surrendered criminal should be tried only for the crime on which his surrender was demanded, and it cannot, therefore, in fairness, be alleged that Her Majesty's government deferred raising the question until there were three important cases of extradition pending. With reference to the allusions which you make to the case of Bouvier, it is to be observed that the point decided in that case was that, under the provisions of the French treaty, (identical so far as the point is concerned with the United States treaty,) unless it had been proved to the court that the French law had provided that Bouvier could not be tried for any other offense than that for which he was surrendered. Bouvier could not have been delivered up under the extradition treaty with France, which contained no such stipulation.

The attention of Her Majesty's government has been called to the letter addressed by the Attorney-General of the United States to the district United States attorney for the southern district of New York on the 22d December, 1875.

That letter is as follows:

"SIR: Application is again made to me in the Lawrence case, with a long record and an opinion of Judge Benedict.

"I now repeat what I have heretofore written with carefulness and urgency, and what I carefully tried to impress upon you when I saw you here, that, for grave political reasons, Lawrence must first be tried upon the charge upon which he was extradited, and upon no other, until that trial is ended, and whether subsequent proceedings for other crimes shall or shall not be taken, must await the order of the President.

"Now, upon an examination of the papers, it is perfectly easy for you and the court to determine upon what charge Lawrence was extradited, and to proceed to try upon that charge, and that only.

"This is a matter of great importance, and you must not blunder in it. There are consequences involved in it of a serious nature, as I have already told you, and we want to proceed in strict conformity with international law and international courtesy; therefore I merely add, try him first upon the charge for which he was extradited, and for that only.

"This instruction is so specific and so definite that it does not seem possible that an honest mistake can be made in this case.

"EDWARDS PIERREPONT,
"Attorney-General."

The question then arises whether the United States Government has, through the Attorney-General, power to stay proceedings in a prosecution which, in his opinion, is contrary to international law and international courtesy.

It appears from the last passage of the judgment of Judge Benedict, delivered on the 27th of March last, that the Government has such power by reason of its legal control over the prosecuting officer.

In the course of the same judgment the judge draws attention to the "political" aspect of the case, as distinguished from the judicial, and this distinction is material to

be kept in view, when cases are cited to show that courts have taken a course in one or two cases, without showing that such course was ever brought to the knowledge of the governments concerned.

This distinction was aptly illustrated in the late case of Blair, who was inveigled by a British subject, with the assistance of American officers, from the United States, and tried at Liverpool for fraudulent bankruptcy, and sentenced to eighteen months imprisonment.

Mr. Justice Miller, before whom this man was tried, took the same view as Judge Benedict, that it was not for the court before whom a prisoner was brought to inquire how he came before it. But, as soon as the facts were brought to the knowledge of the Government, and an inquiry had been made, although it was not clear whether the trick by which J. H. Blair was removed from the jurisdiction of the United States was the act of the British subject or of the American officers, the British government at once released Blair and sent him back to America, paying his expenses to the place from which he had been brought.

In a letter from the United States Attorney-General, he states: "We want to proceed in strict conformity with international law and international courtesy."

What, then, is the international law on the subject?

Her Majesty's government maintain that there is no country in the world which claims the right now put forward by the United States Government.

It will be found that France, which has the largest experience in extradition law and practice, and the largest number of extradition treaties with other countries, has never claimed such a right, whether there was any stipulation in the treaty to that effect or not; and that no country can be pointed out which puts forward such a claim.

Her Majesty's government must, therefore, adhere to the decision which they have maintained from the very first moment that they were assured of the intention of the United States Government to try Lawrence for other than the extradition crime for which he was surrendered. They have always regarded the claim so to try him as a breach of the treaty of 1842, and they have nothing to add to the opinion expressed in my notes to General Schenck and yourself of the 29th of February and the 11th ultimo.

Her Majesty's government deeply regret that there are two other cases which must follow their decision in regard to the case of Winslow; but they can only interpret Mr. Fish's views as conveyed in your note of the 20th ultimo as a distinct assertion of the right of the United States Government to try Lawrence for any offense whatever, and as a distinct refusal to come to any arrangement that Winslow and the other extradition prisoners now in custody here shall not be treated in a similar manner.

Her Majesty's government must act as the law of England and the practice of all other countries require them to act, and can only express their deep regret that the operation of a treaty, which, limited as it was, has worked for the mutual benefit of both countries, should be in danger of being so unnecessarily terminated.

They will not abandon the hope that the United States Government may yet consent to give such assurances as will enable the two governments to maintain it unimpaired.

I have, &c.,

DERBY.

Mr. Hoffman to Mr. Fish.

No. 82.]

LEGATION OF THE UNITED STATES,
London, May 11, 1876.

SIR: I have the honor to inclose to you copies of two notes I have received from Lord Derby upon the subject of the extradition of Winslow.

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure 1 with No. 82.]

Earl Derby to Mr. Hoffman.

FOREIGN OFFICE, May 5, 1876.

SIR: The note which I had the honor to address to you under yesterday's date contained the answer of Her Majesty's government to the letter which, by direction of

your Government, you addressed to me on the 20th instant. Since my note was prepared I have received from you a copy of the dispatch from Mr. Fish, dated the 31st of March, on which your letter was founded.

This dispatch has been communicated to Her Majesty's secretary of state for the home department, who has requested me to call your attention to the passage in Mr. Fish's dispatch in which, alluding to Lawrence's case, he says that "although not arraigned on any other indictment than for the forgery for which he was extradited, the British home office has raised the question that he may be possibly tried upon other charges and for other crimes."

The home secretary wishes to observe upon this, that no question was raised by him until he was satisfied that Lawrence had been indicted, although not yet arraigned for the offense of smuggling, and that Mr. Fish had signified to Sir E. Thornton that the United States Government claimed the right to try him for other offenses than that for which he was surrendered.

Information to this effect was received from Her Majesty's minister at Washington, on the 28th of November.

I have, &c.,

COLONEL HOFFMAN, *ſc.*

DERBY.

[Inclosure 2 with No. 82.]

Earl Derby to Mr. Hoffman.

FOREIGN OFFICE, *May 6, 1876.*

SIR: I referred to Her Majesty's secretary of state for the home department your note of the 3d instant, in which you called attention to some recent cases of extradition from Canada, and I have the honor to state to you that I have been informed, in reply, that the home secretary has nothing to add to his former opinion upon the case of Winslow, except that he differs from the opinion of the Canadian judges, in the cases referred to, and that he would wish your attention to be called to a different decision in the case of the Lennie mutineers heard yesterday, at the Old Bailey, where Mr. Justice Brett held that a prisoner delivered up under the French extradition treaty for murder could not be put on his trial for being an accessory after the fact.

I beg leave also to refer you to the views already expressed in my note of the 4th instant, as to the distinction to be drawn in these cases between that which is within the province of courts and that which belongs more properly to governments to decide.

I have, &c.,

Colonel HOFFMAN, *ſc.*

DERBY.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, *May 12, 1876.*

FISH, *Secretary, Washington:*

Am notified Government will oppose discharge of Winslow to-morrow on ground you have not received note of 4th May, and with hope that arrangement may yet be come to.

HOFFMAN.

Mr. Hoffman to Mr. Fish.

No. 84.]

LEGATION OF THE UNITED STATES,
London, May 13, 1876. (Received May 24.)

SIR: Referring to previous correspondence upon the subject of Winslow, I have the honor to forward to you copies of two notes I have received from Lord Derby upon this subject.

I have, &c.,

WICKHAM HOFFMAN.

[Inclosure No. 1 in No. 84.]

Earl Derby to Mr. Hoffman.

FOREIGN OFFICE, May 10, 1876.

SIR: I have the honor to acknowledge the receipt of your note of the 8th instant, stating that Mr. Fish requests that your note of the 20th instant may be considered as withdrawn, and that his dispatch of the 31st of March, which was forwarded to me in a note from you dated the 29th (not 27th) ultimo, may be substituted for it.

I have, &c.,

DERBY.

[Enclosure No. 2 in No. 84.]

Earl Derby to Mr. Hoffman.

FOREIGN OFFICE, May 11, 1876.

SIR: With reference to my letter of the 3d instant, acquainting you that Winslow's case had been remanded for ten days, on the application of the attorney-general, I have the honor to state to you that I have been informed by Her Majesty's secretary of state for the home department that the attorney-general will be instructed to ask for a further postponement of Winslow's release when the next application is made to the judge, on the expiration of the postponement granted when the former application was made.

Her Majesty's government are most anxious that nothing should be wanting on their part to keep alive the possibility of coming to an arrangement with the United States Government on the extradition question now pending between them; and the ground on which the judge will be asked for a further postponement will be that there has not yet been time for Mr. Fish to have received the answer to his despatch of the 31st March, which was sent to you on the 4th instant.

The home secretary is, of course, unable to say whether the judge will accede to this application; but, in notifying that it will be made, he has expressed his extreme regret that there should be any risk of a cessation of the satisfactory working of the extradition treaty of 1842, which has been of such great mutual benefit to both countries.

I have, &c.,

DERBY.

Colonel HOFFMAN,
 &c., &c., &c.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, May 20, 1876.

FISH, Secretary, Washington:

Lord Derby suggests I should remind you, as matters stand, Winslow will be released Tuesday; asks if you have any communication to make. Says they would be happy to consider it.

HOFFMAN.

Mr. Fish to Mr. Hoffman.

[Telegram.]

WASHINGTON, May 20, 1876.

HOFFMAN,
 Chargé, London:

Lord Derby's note not received until 17th instant. Public journals report the attorney-general as having said, on 13th, on asking Winslow to be remanded for ten days, that unless reply were received within

that time, no further detention would be asked. Lord Derby's note cannot be replied to by telegraph; no other mode of transmission could put it in London by the 23d.

If the British government is determined to refuse to surrender the fugitive, except on receiving the stipulation demanded, it is right to say to Lord Derby that it is impossible to give the stipulation. The President has not the power, if he were disposed to do so, as will be explained in a reply to his note, now being prepared, and which will be forwarded at an early day.

You will read this to Lord Derby.

FISH,
Secretary.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, May 22, 1876.

FISH, Secretary, Washington :

Read telegram to Lord Derby. Will see what can be done to secure another remand. Talked case over.

* * * * *

London Times reviews your dispatch in leader. Approves it, praises it, and says Winslow should be surrendered.

HOFFMAN.

No. 887.

Mr. Fish to Mr. Hoffman.

DEPARTMENT OF STATE,
Washington, May 22, 1876.

WICKHAM HOFFMAN, Esq., &c. :

SIR: Your No. 79, under date of May 6, inclosing a copy of a note addressed to you by Lord Derby, in relation to the extradition of Winslow, bearing date May 4, reached me late on the 17th instant.

This note of Lord Derby's on its face is a reply to a note from you to him, wherein you communicated the general purport of an instruction addressed by me to you, under date of the 31st of March last; but on the 29th of April last you had given to Lord Derby a copy of the instruction of 31st of March. His lordship's note of the 4th of May is therefore taken as a reply to that instruction, although it contains allusion to some expressions in your note which were not there in pursuance of your instructions.

If Her Majesty's government had simply persisted in a refusal to deliver Winslow and the other criminals now in custody awaiting extradition, for the reasons heretofore given, it would have been unnecessary to prolong discussion, inasmuch as the distinct and definite refusal of this Government to give any assurance or stipulation not called for by the treaty, or to admit the right of Great Britain to exact from the United States stipulations foreign to the treaty, as a condition of the performance by Great Britain of her obligations, had already been communicated to Lord Derby.

But as the note in question assumes to give the grounds on which the

refusal to surrender the criminals is based, and in large measure seems to change those previously assumed, and as the United States cannot assent to the accuracy of many of the statements made, or to the inferences drawn therefrom, it seems necessary that some reply should be made.

In my instruction of the 31st of March last, reference was made in detail to numerous cases decided in the courts, and to evidence from various sources, alike British and American, including the testimony of British officials best versed in extradition law, the opinions of British Crown lawyers, the published decisions of British courts and British writers upon extradition law, that where a criminal was in good faith demanded for one offense within the treaty, and surrendered therefor, there was no agreement, understanding, nor practice that he might not be placed on trial for another offense with which he was charged, in addition to the extradition crime.

Lord Derby does not explain, modify, or deny that this whole current of authority is to this effect, but meets the point with the assertion that "there is no case within the knowledge of this [the British] government in which a prisoner was surrendered by England for one offense, and tried by the United States for a different one," and states that the case of Heilbronn was a "private prosecution," and that no evidence can be found of the attention of the government having been called to it. In a subsequent passage he again speaks of "private prosecutions," to which the attention of the government has not been called. I am at a loss to appreciate the application of the term "private" to the prosecution of a felony in the name and behalf of the state or sovereign. If, however it means no more than what is claimed when it is said that the attention of the government had not been called to a particular case, the question arises as to that jealous protection of individual and personal rights which is the just pride of British as it is of United States laws, and which constitutes so large a part of Lord Derby's note. The alleged criminal in whose behalf the state has exercised its sovereign power, whom it has seized and brought from a distant land under solemn treaty obligations, is especially entitled to be looked after by the state, and be protected in such rights as belong even to the criminal.

If Lord Derby's theory, that the prohibition of the trial of a surrendered fugitive, for other than the specific crime for which he had been delivered, be correct, either as a recognized principle of the general or international law of extradition, (if there be any such agreement between nations on the subject of extradition as to form what can be regarded as "international law,") or as implied in the treaty of 1842, then a surrendered fugitive is, under such international law, (if such it be,) or under such treaty, placed in the hands of the receiving government with the highest obligations of honor, of justice, and of international faith to protect that fugitive from any other prosecution than such as that government claims that he is liable to.

The fugitive is surrendered to the government in its political capacity, and if he be subjected to any prosecution against which he has a right to immunity, the government, into whose especial charge and guardianship he has been surrendered for a specific purpose, violates its faith and neglects its duty, both to the individual surrendered and to the state which surrendered him. On the theory advanced by his lordship, the surrendered fugitive must look to the state in its political character—what Lord Derby calls "the government"—for his protection; and that power, call it state or government, cannot escape its responsibility by the plea of ignorance, and that its attention had not been called to the case?

Heilbronn was a fugitive criminal demanded by Great Britain under the treaty of 1842, on the charge of forgery, and was accordingly delivered up by the United States to British justice. He was tried for forgery before a British court and acquitted, and was thereupon indicted and tried for a public offense not named in the request or warrant of extradition, and one not included in the treaty, and he was thereof convicted.

If, under British jurisprudence, no public prosecutor is provided to enforce her law against criminals surrendered on a demand made upon a foreign state, and the duties of a prosecutor are discharged by an individual not technically a servant of the Crown, but permitted to assume that office, can the government of Great Britain claim or expect that the regular proceedings in her courts can be disavowed by the political branch of the government as not having been brought to its attention, or that such proceedings form no element in determining what has been the practice of the two governments under the treaty?

Heilbronn's case was not referred to as an exceptional one, but as one of the numerous instances all tending to prove the unbroken practice and understanding of the two governments.

In addition to Heilbronn's and the other cases heretofore referred to by me, there are other and recent decisions of distinguished British judges directly upon the point, and in full harmony with the views maintained by the United States.

Mr. Justice Ramsay, in the case of Israel Rosenbaum, in the supreme court of Canada, in 1874, when the discharge of the prisoner was claimed because there was no prohibition under the laws of the United States against the trial of criminals for offenses other than those for which they were extradited, as was required by the act of 1870, says:

"If it were recognized as a principle of international law that a prisoner extradited could only be tried for the crime for which the extradition took place, it would not have been necessary for the Imperial Parliament to make these provisions," (alluding to the provisions of the act of 1870,) and adds, "I am not, however, aware that it has been laid down in England, that a man once within the jurisdiction of English courts could set up the form of his arrest, or the mode by which he came into custody, as a reason for his discharge when accused of crime," and the same was substantially held in the case of Worms, extradited from Canada within the last few weeks.

It is not the province of any government to make inquiry into the extent of knowledge which the political department of another government may have as to the practice or the administration of justice in its courts in reference to extradition, but I have alluded in prior instructions to the uniform practice, without dissent or objection, in both countries under the treaty of 1842, and have shown that it was common in both countries, and that it was held by high judicial decisions in both, that a prisoner, extradited in good faith for an extradition crime, might also be tried for another crime.

Lord Derby, in his note, again refers to the provisions of the act of Congress of August 12, 1848, as showing that persons delivered up could not be tried for any offenses other than those for which they were surrendered; although in my former instructions I stated that the United States district court, and the Solicitor-General, acting in the place of the Attorney-General, had each separately decided precisely the opposite. The construction of the municipal laws of a state pertain to that state, and not to other governments.

In the United States, a treaty, duly ratified and exchanged, is the supreme law of the land, and its provisions are binding without legisla-

tion. It becomes convenient, however, from time to time, to enact laws to regulate the general course of proceedings arising under one or a variety of treaties; but such legislation is purely internal and municipal.

The act of 1848 recognizes the fundamental doctrine that the surrender of a fugitive criminal is a political act of the Government, and the function of the court or magistrate is only to determine whether a case has been made out in accordance with the treaty, or the statute enacted in aid of its enforcement. It neither adds to nor detracts from the obligations created by the treaty, and is not essential to the execution by the United States of its engagements under the various extradition treaties into which this Government has entered, but affords a convenient and satisfactory aid in the administration of those obligations.

When the United States, by the twenty-seventh section of the treaty of 1794, in much the same language as the present treaty, engaged to deliver up fugitives, no act whatever was passed, but fugitive criminals, nevertheless, were given up on the demand of Great Britain under that provision of the treaty.

In like manner when the tenth article of the treaty of 1842 went into effect, no statute was needed, but six years thereafter (in 1848) the act in question was passed as being thought advisable to provide machinery to carry out all treaties providing for extradition, not only with Great Britain but with all governments with which the United States had and might have treaties, no matter what may be their particular provisions.

Of these treaties, some, as I have said, contain restrictions as to the crimes for which a criminal may be tried by the state demanding him, and others are silent on the question; but the act applies to all.

Lord Derby, in his note to you, contends that the British extradition act of 1870 imposed no new condition upon the treaty of 1842, but in his note of April 13 he refers to the condition "which Her Majesty's government are compelled to require under section 3, subsection 2, of the act of 1870."

When it is proposed to engraft, whether by implication or by act of Parliament, upon an existing treaty, a provision not expressly contained therein, I may be permitted to look into the debates in the British Parliament in 1866, when it was proposed to amend a bill to carry into effect the treaty with France, by requiring a stipulation similar in its purport to that now asked of the United States, and there find that his lordship, at the time Lord Stanley, and then, as now, Her Majesty's Secretary of State for Foreign Affairs, opposed the amendment, saying that "in a case like this, international courtesy demanded that the treaty should not be materially altered without communication with the other party."

In the same debate Lord Cairns, then attorney-general and now lord chancellor, said that the bargain was made between the sovereigns, and the amendment "proposed to introduce a new ingredient into the bargain which did not exist at the time the bargain was made. It might have been unreasonable that this new ingredient had not been introduced at the beginning, but to introduce it now was simply to break the bargain which the sovereigns had made and Parliament had ratified; it was to infringe upon treaty engagements, and that without notice to the other side." And further, and in particular reference to the latter part of the amendment, quite similar to the provisions of the act of 1870, now under discussion, he said, "to put such words into an act of

Parliament, which did not exist in the treaty, would only be offering a gratuitous insult to the foreign power to whom it applied without securing any real advantage." The amendment was withdrawn.

The treaty between Great Britain and France, which was the subject of that debate, was, like that between Great Britain and the United States of 1842, silent as to an inhibition of the prosecution of a surrendered fugitive for other than the specific offense for which he was given up. The proposition in Parliament thus sternly and honestly denounced and defeated as "discourteous," as "breaking a bargain," as "infringing upon treaty engagements," as "a gratuitous insult to a foreign power," and as "securing no real advantage," is, nevertheless, what it is now claimed has been done by virtue of the act of 1870 with regard to the United States.

Her Majesty's Court of Queen's Bench in *Bouvier's case*, and more recently the courts in Canada, have substantially held the same high doctrine which the eminent statesmen whom I have cited not long since announced in their places in Parliament. Neither international law nor international courtesy have changed the principles on which they were then recognized as resting.

The United States adheres to the position announced in my former instruction, that it will recognize no power to alter or attach conditions to the executory parts of an existing treaty, to which it is a party, without its previous assent.

Lord Derby seems to imagine some want of reconciliation between the views of the United States upon this extradition question and those asserted in its behalf on the rights of political asylum, and asks what is to prevent the United States from obtaining a prisoner on one charge and trying him for a political offense. The answer is ready:

The inherent, inborn love of freedom, both of thought and of action, engraved in the hearts of the people of this country so deeply that no law can reach and no administration would dare to violate.

A large proportion of those who sought refuge on our shores prior to the formation of this Government, sought this country for the enjoyment of freedom of opinion on political and religious subjects, and their descendants have not forgotten the value of an asylum nor the obligation of a state to shelter and protect political refugees. Neither the extradition clause in the treaty of 1794 nor in that of 1842 contains any reference to immunity for political offenses, or to the protection of asylum for political or religious refugees. The public sentiment of both countries made it unnecessary. Between the United States and Great Britain, it was not supposed, on either side, that guarantees were required of each other against a thing inherently impossible, any more than, by the laws of Solon, was a punishment deemed necessary against the crime of parricide, which was beyond the possibility of contemplation.

That a sentiment stronger than written law has been sufficient to prevent any attempt to infringe on this right, it is but necessary to recall the political events occurring in England, in Ireland, and in the United States since the treaty of 1842 has been in force, the attempted and actual rebellions which have been witnessed, and the consequent exodus of parties engaged, and yet not a demand by either government upon the other for the surrender of a fugitive for a political offense. In this respect, what has been, must continue to be.

Careful as this Government has been and will be to maintain the right of asylum for political and religious refugees, it is mindful of the duty to its own citizens and to society at large devolving upon a state

to visit punishment upon offenders against the laws—a duty in no way antagonistic to the preservation of the right of asylum.

The rights of society and the duties of the state in the punishment of criminals should not be narrowed and unduly restricted upon the vague suggestion or fear that at some time some political criminal may be placed in jeopardy.

The duty of Government to protect its own citizens and punish crime is equally a duty with that of affording hospitality and shelter to political offenders from abroad.

The Government of the United States sees no reason why either should be sacrificed to the other, any more than why all criminals should escape for fear some political offender may suffer.

His lordship believes that the only test and safeguard for the liberty of the individual and the maintenance of the right of asylum are to be found in the principle for which he contends, that the crime or crimes of which a man is accused in the country surrendering, and for which he is surrendered, are the only crimes for which he ought to be tried in the country claiming.

Differing with his lordship, I think that the liberty of the individual and the right of asylum would be equally guarded (independently of any reliance on common principles and on the good faith of both nations) by a treaty providing that a surrendered criminal shall be tried for none other than one of the several crimes enumerated in the treaty, and for which each government is willing to surrender. The fugitive would thus be effectually protected against trial for a political offense, justice would be more effectually administered, and crime be allowed less chance of escape.

The United States would not object to such limitation in any treaty which it may be called upon to negotiate with a foreign state. But, with the limitation proposed by Lord Derby, it is possible that if a criminal be surrendered on a charge of murder, and if the evidence developed on the trial establish only manslaughter, he might consequently escape; or if one be charged with assault with intent to kill, and after the issuing of the requisition or of the warrant the victim dies, it is doubted whether in this case, under the common law of England, which obtains also in most of the United States, the fugitive could be convicted of assault, &c., and not having been surrendered for murder, the doctrine contended for would protect him from trial on such charge.

I should not here again advert particularly to the British act of 1870 but that Lord Derby's note seems to invite some examination of its provisions, and that he alludes to the abortive efforts made since its enactment to negotiate a new treaty of extradition between the United States and Great Britain, and (as he seems to claim) under its provisions.

In 1870, Great Britain had three treaties of extradition—with France, Denmark, and the United States.

Owing to difficulties presented by British law, the treaty with France had been, at least between 1843 and 1866, practically a dead letter; the treaty with Denmark has (as has been represented) rarely been resorted to, if at all.

The English practice as to extradition had been with the United States under the treaty of 1842. What that practice had been I have shown.

Great Britain at this time determined to establish a system of extradition, applicable to all governments, for her convenience, and in order to save the difficulty which had been experienced in obtaining the assent

of Parliament, or in providing the means of carrying out a treaty, and in substance proposed to define under what limitations and conditions extradition ought to be and might be had.

It was her right to propose a system and to invite foreign states to accede to her views and make treaties thereunder. The general system, however, was anomalous. It applied the same restrictions to a Christian or a non-Christian state, and left no opportunity to suit a particular treaty to the particular demands of two governments. Soon after the passage of the act of 1870, a proposition was made to the United States to make a treaty thereunder, and after some examination the proposition was declined.

In 1873, an amendatory act was passed, and further application being made, a negotiation was inaugurated.

Difficulties were experienced at the outset, and at every stage, growing out of the system which had been adopted and the inflexible character of the provisions of the act. Various draughts were from time to time prepared at the British foreign office, and discussed, with an effort to reach an agreement. In these draughts it was proposed that a criminal should not be tried for any offense committed prior to his surrender, other than the particular offense on account of which his surrender was made; and while an effort was made to extend the right to try a criminal to any of the extradition crimes named in the treaty, and to any higher crime than that for which he was surrendered, the effort was abandoned because the United States was informed that under the act a provision was inadmissible by which an offender surrendered for one offense named in the schedule could be tried for any other than the extradition crime. The negotiation was continued, however, until June, 1874, when the United States reached the conclusion that a treaty could not be negotiated under the act.

That this Government ever reached or expressed the opinion that this act was the embodiment of what was the general opinion of all countries on the subject of extradition, is far from correct.

On the contrary, the United States was and is of the opinion that, as the provisions in a treaty placing limits on the right of a foreign state to try extradition criminals are chiefly inserted to protect political refugees, it amounts to a surrender of criminal justice to that principle to limit the right to a trial for the single particular crime named in the warrant of extradition, but that a proper limitation might be made by providing that the criminal shall be tried for no political offense, and for no crime not an extradition crime.

Such is understood to be the provision in almost all the French treaties negotiated with European powers; such was substantially the provision in the treaty negotiated between Great Britain and France in 1852, and such is the express provision inserted in the treaty negotiated between the British island of Malta and Italy in 1863, and approved in Great Britain.

From the earliest period this Government has had occasion to consider the questions arising under extradition law; the Articles of Confederation having extradition provisions, as has the Constitution of the United States, governing the question between the States of the Union; and while the United States do not profess to lay down rules of international law on this question, this Government does not consider it now for the first time, nor has its jurisprudence been silent in developing the system. In the negotiation referred to, the attention of the Government of the United States was directed to the proposed treaty

more than to the act, looking to its provisions as binding on the government of Great Britain, entirely irrespective of the act in question.

But many of the provisions of the act did not, and do not, seem to be reciprocal, and appear to furnish excuses for a failure to perform an obligation imposed by a treaty made thereunder, or a shelter for a responsibility which naturally belonged to the government.

In view of the position assumed by Great Britain during this controversy, by which treaty provisions are practically made subservient to acts of Parliament, the difficulty and want of reciprocity in making any treaty thereunder become more apparent.

It is not my intention to attempt to critically examine this British statute, but it will not be inappropriate to refer to some of these provisions.

Her Majesty's government reserves to itself the right by section 2, after an arrangement has been made with a foreign state, by the order in council applying the act, or by any *subsequent* order to "limit the operation of the order," to restrict the same, and to "render the operation thereof subject to such conditions, exceptions, and qualifications as may be deemed expedient."

Again, section 2, subdivision one, provides that a fugitive criminal shall not be surrendered for a political offense, "or if he prove to the satisfaction of the police magistrate, or the court before whom he is brought on *habeas corpus*, or to the secretary of state, that the requisition for his surrender has in fact been made with a view to try or punish him for an offense of a political character." In substance, therefore, the criminal may take two appeals from the decision of a police magistrate on this question, and, provided he succeeds on any application, he may be discharged; but no provision is made for an examination of the question in any quarter, should the police magistrate decide in favor of the criminal. In such event a question, which is purely one for the government to deal with, is remitted to a police magistrate, and should he improperly decide, the government is sheltered by a quasi judicial decision, and this of an officer not necessarily of a high grade.

Again, section 2, subsection three, provides that a fugitive criminal shall not be surrendered unless provision is made by law in the foreign state, or by arrangement, that he shall not, until he has had an opportunity of returning, &c., be tried "for any offense committed prior to his surrender, other than the extradition crime, proved by the facts on which the surrender is grounded."

It will be seen the word "crime" is carefully used, in the singular, and, as Lord Derby states in his note, this Government was informed in 1870 that any provision would be inadmissible by which a prisoner surrendered for one offense could be tried for any "other than the extradition crime for which he was surrendered."

But when the corresponding provision limiting Great Britain to trials is examined, (section 19,) it is provided that a criminal so surrendered "shall not be triable, or tried, for any offense committed prior to the surrender in any part of Her Majesty's dominions, other than *such of the said crimes as may be proved by the facts on which the surrender is grounded.*"

The want of reciprocity of these provisions is quite clear, inviting frequent questions and difference.

To make one further remark as to this act, the latter part of section 7 provides that if the secretary of state is of opinion that an offense is one of a political character, he may refuse an order for a warrant of

apprehension, and that he may "at any time order a fugitive criminal, accused or convicted of such offense, to be discharged from custody."

In the draughts of treaties prepared and submitted to this Government, under this act, no such corresponding authority to discharge criminals in custody was proposed to be given to the United States, nor does the act seem to contemplate a reciprocal right to other powers.

I repeat that this act does not concern the United States, except in so far as it is put forward to limit our treaty rights, and I have been drawn into any consideration of its system, or particular provisions, only from the language of Lord Derby, that it was the embodiment of the general opinion of all countries on the subject of extradition.

Moreover, if the United States had been willing to negotiate a new treaty, which should contain certain restrictions as to trials not included in the existing treaty, and give certain advantages not known thereto, such readiness could not justify Great Britain, after the negotiation had failed, in withholding all the advantages and in seeking to ingraft upon the old treaty such of the rejected provisions as she might select; particularly so when the act of Parliament of 1843 (6 and 7 Vict., ch. 57) was by its provisions to continue as long as the treaty; and the twenty-seventh section of the act of 1870 exempted the treaty with the United States from the clauses which were foreign to its terms; and when the United States, soon after the passage of the act of 1870, and on January 27, 1871, had informed Her Majesty's government that this Government understood the twenty-seventh section of the act of 1870 as giving continued effect to the existing engagements for the surrender of criminals, to which no dissent was at any time or in any form or manner expressed. In fact, the understanding of the United States on this question was not only not dissented from, but has been sustained by the supreme court of Canada in Worms's case in 1876, and in Rosenbaum's case in 1874, where the court states: "I cannot see how a new provision of the act of 1870 could be consistent with the treaties with France, the United States, and Denmark;" and by the conclusion, so far as a conclusion was reached, by the court of Queen's Bench in the case of Bouvier, in 1872, to which I have heretofore referred, where the lord chief justice says that, although he hesitates to express an opinion, he plainly sees that it was intended, while getting rid of the statutes by which the treaties were confirmed, to save the existing treaties in their full integrity and force, and that, had it been necessary to decide that point, he would have been prepared to do so.

Having examined that case with care, as to what was there decided, I read with surprise Lord Derby's statement that the point decided was that, under the provisions of the French treaty, unless it had been proved to the court that the French law had provided that Bouvier could not be tried for any other offense than that for which he was surrendered, Bouvier could not have been delivered up; and I am quite satisfied that a perusal of the case itself will tend to a very different conclusion.

Lord Derby makes reference to certain correspondence between an official of the home office and the solicitors of Lawrence soon after his surrender, and before any representation had been made to this Government. This correspondence assumed in a few words to prejudice and dispose of the whole question, and to state what was the law of this country, and the general law of extradition of all countries, in reference to the trial of surrendered fugitives. It was unknown to and unauthorized by this Government, and founded on the representation and the argument of the criminal. It appeared in the public prints, and

was used by the counsel and friends of Lawrence in the United States to prejudge the question and create difficulty between the two governments; and I deeply regret the necessity which requires me to question the reference to *ex-parte* representations made by the paid solicitors of a criminal to an official of a foreign power, in the discussion of a grave question involving the rights and impugning the conduct of a friendly state, and jeopardizing the maintenance of a treaty of long standing and of beneficial operation.

Lord Derby also quotes a letter of instruction addressed by the Attorney-General of the United States to the district attorney at New York in reference to the trial of Lawrence, whose case in the whole correspondence seems to have overshadowed that of Winslow, which alone is the subject of the present requisition made by the United States upon Her Majesty's government, and his lordship inquires as to the power of the Attorney-General over prosecutions instituted against extradited criminals.

The letter in question was addressed by the head of the Department of Justice to one of his subordinate officers, in reference to the conduct of a case under his charge. The Attorney-General directs that "Lawrence must first be tried upon the charge upon which he was extradited, and upon no other, until that trial is ended." This letter of instruction, passing from a superior to a subordinate officer, was not, and was not intended to be, an exposition of the views of the Government upon any general proposition, but a specific instruction in a particular case; and whether or not he had ever examined the opinion of the late distinguished under-secretary of state for foreign affairs of Her Majesty's government, he seems to have been guided by the same appreciation of treaty rights and of international law which led Lord Hammond, in his examination before the special committee of the House of Commons, to say, "We admit in this country that if a man is *bona fide* tried for an offense for which he was given up, there is nothing to prevent his being subsequently tried for another offense, either antecedently committed or not."

In reply to the question of Lord Derby as to the power of the Attorney-General over prosecutions, it will be borne in mind that in the United States an offense may be against Federal laws, or against the laws of one of the States. The Attorney-General has power to control all criminal prosecution for offenses against the Government pending in the Federal courts, but no power whatever to interfere, directly or indirectly, in any State prosecution. The President has, in like manner, power to pardon criminals convicted, and to direct the suspension or dismissal of criminal prosecutions in the Federal courts, but none to pardon those tried and convicted in the State courts, or to control the proceedings of these courts.

Criminals of both classes come under the extradition treaty. It happens that Lawrence is charged with crimes against the Government, and Winslow and the other forgers with crimes against State laws.

Neither the President, nor any officer of the Federal Government, has power to control or to dismiss the prosecution in Winslow's case, or in any case where the offense is against the laws of one of the States, and could not give any stipulation or make any arrangement whatever as to the offenses for which he should be tried when returned to the justice of the State against whose laws he may have offended.

But, as I have before stated, a treaty, duly ratified and proclaimed, is in the United States the supreme law of the land, and if the extradition treaty did, as it does not, provide that no criminal could be tried

for any other than certain particular offenses, such a provision would be binding upon all courts, both State and Federal.

The absence of any such provision from the treaty between the United States and Great Britain leaves to the State courts the extent of jurisdiction over returned criminals, which has been so repeatedly referred to as recognized by the judicial decisions of the courts of both countries.

His lordship refers to the "late case of Blair, who was" (as his lordship mildly expresses it) "inveigled by a British subject, with the assistance of American officers from the United States, and tried at Liverpool for fraudulent bankruptcy, and sentenced to imprisonment." He was promptly released by the British government, which sent him back to the United States, paying his expenses back to the place whence he had been brought. This prompt and generously just conduct of Her Majesty's government is duly recognized and appreciated by the United States.

The abduction was, however, regarded by this Government as a case of kidnapping; but the power so promptly and efficiently exercised by the British government is an evidence of the inherent power existing in the political department of that government, when it sees fit to exercise it, over the person of the individual, and in control even of the judgments of the courts. Could not the power thus summarily exercised in an act of comity, and in consideration of a wrong committed in a distant jurisdiction, be also exercised in the performance of a treaty obligation, and in aid of the administration of justice, without being hampered by the technicalities of a municipal act? Whether Blair personally desired to be returned to the United States is not known, nor is it supposed to be of any consequence. He was deported and sent out of Her Majesty's jurisdiction by the political authorities of the government without process of law, but merely upon the representation of the United States of the circumstances attending his abduction or inveiglement.

His lordship speaks of having been "assured of the intention of the United States Government to try Lawrence for other than the extradition crime for which he was surrendered." Her Majesty's government has never been thus assured, and for the very good reason that the Government of the United States has never reached any such conclusion, and has neither expressed nor formed any such intention. It does, however, hold to the opinion that, if thus inclined, it has the power and the right, after having tried him on the charge on which he was surrendered, (although he may have been surrendered on only one of twelve or more charges of which the proofs were furnished,) with a *bona-fide* intent and effort to convict him on that one charge, to try him for others of the many offenses of which he has been guilty. It does not conceal, but avows, its belief in this right. And hereupon Lord Derby advances the startling declaration, which I repeat in his own words: "They" (Her Majesty's government) "have always regarded the claim so to try him as a breach of the treaty of 1842."

If Her Majesty's government seriously advances this as indicating a mode whereby, in their judgment, a treaty may be broken, it is as novel as it may prove to be far-reaching. It is simply the proposition that the assertion by one party to a treaty of a claim, or of a construction of the instrument not admitted by the other, and without any act in derogation of the convention or of the rights of the other party, constitutes of itself a breach of the treaty.

I note this assertion, not with a view to discussion, but in the hope that so dangerous a doctrine may prove to have been unguardedly ad-

vanced, and may not be left unexplained or unavowed to justify future action (from whatever quarter) upon its broad statement, under which treaties and conventions become worthless.

While it may not be necessary to repeat the position of the United States, it is proper to say that the United States has simply demanded the performance by Great Britain of her treaty obligation to deliver fugitives under the treaty of 1842, as the same has been in operation for more than thirty years, and insists that no British statute can attach a condition to the treaty foreign to its terms.

If any proceedings in the United States, in the case of any criminal, have given rise to question or complaint, this Government is prepared to hear and properly dispose of any such complaint.

But while the treaty shall be in force, the Government of the United States would be strangely forgetful of the dignity and rights of the country if a foreign state were permitted to exact stipulations or engagements pursuant to her law, but foreign to the treaty, as a condition of obtaining the performance of treaty obligations.

It will be a cause of great regret that a treaty which has worked so long and so beneficially should be terminated on such a ground; but the decision of this question is for the authorities of Great Britain. The United States has in due form, and after complying with every requirement of the treaty, demanded the surrender of Winslow and the other criminals in London, and it is for Her Majesty's government to decide whether Great Britain will or will not perform her treaty obligations.

You will read this instruction to Lord Derby, and in case he desires it, you will furnish him with a copy.

I am, sir, your obedient servant,

HAMILTON FISH.

Mr. Fish to Mr. Hoffman.

No. 890.]

DEPARTMENT OF STATE,
Washington, May 24, 1876.

SIR: Since instruction No. 887, dated the 22d instant, was prepared, I have received your No. 82, under date of the 11th instant, inclosing copies of two notes addressed to you by Lord Derby on the subject of the extradition of Winslow, bearing date, respectively, the 5th and 6th instant.

In the former of these notes Lord Derby informs you that a copy of instruction of March 31, which had been transmitted to him by you on April 29, had been communicated to Her Majesty's secretary of state for the home department, who had requested him to call your attention to the part which alludes to Lawrence's case, and which states that, although not arraigned on any other indictment than for the forgery for which he was extradited, the British home office has raised the question that he may be possibly tried for other charges and for other crimes, and states that the home secretary wishes to observe that no question was raised by him until he was satisfied that Lawrence had been indicted, although not yet arraigned for smuggling.

An indictment was found against Lawrence for smuggling, February 3, 1875, a month before any steps had been taken toward his extradition or any demand made therefor.

The indictment had been found some time before he departed for Great Britain; his extradition was not asked therefor, nor was the

charge proved against him in the proceedings in London, and he has not been arraigned upon it in this country.

The United States has stated what is claimed to be the practice and the right of this Government under the extradition treaty, but has not stated its intentions as to the trial of Lawrence, nor has Her Majesty's government, so far as I am aware, any evidence to justify any conclusion on that point.

Lord Derby, in his subsequent note of the 6th of May, informs you, in reply to your note transmitting references to certain late decisions in the supreme court of Canada, not in harmony with the position assumed in the case of Winslow, that the home secretary has informed him that he differs from the Canadian judges, and calls attention to the case of the Lennie mutineers, heard on May 5, in London.

This case, as I apprehend, would be governed by the French treaty made under the law of 1870, and by that act, and, if so, would be in no way applicable to the present discussion.

You will furnish Lord Derby with a copy of this instruction.

I am, &c.,

HAMILTON FISH.

Mr. Hoffman to Mr. Fish.

No. 95]

LEGATION OF THE UNITED STATES,
London, May 25, 1876.

SIR: I have the honor to forward to you herewith a copy of the only note of importance I have lately received from Lord Derby in the Winslow matter. I add a copy of my reply.

I have the honor to be, with great respect, your obedient servant,
WICKHAM HOFFMAN.

Lord Derby to Colonel Hoffman.

[Inclosure No. 1 with No. 95.]

Immediate.]

FOREIGN OFFICE, *May 19, 1876.*

SIR: With reference to my note of the 13th instant, I have the honor to remind you that the hearing of the application for the release of Winslow from custody was postponed for ten days from the 13th instant, and that as matters stand at present, he will be released on Tuesday, the 23d instant.

Her Majesty's government would be happy to consider any communication which Mr. Fish might instruct you to make on the subject, after having received my letter to you, of the 4th instant; and if no such instructions should have reached you, I would suggest that you should call the attention of your Government, by telegraph, to the date at which Winslow will be released, and should inquire if they have any further communication on the subject to make to Her Majesty's government.

I have the honor, &c.,

DERBY.

Mr. Hoffman to Earl of Derby.

[Inclosure 2 with No. 95.]

LEGATION OF THE UNITED STATES,
London, May 20, 1876.

MY LORD: I have the honor to acknowledge the receipt of your note of yesterday in reference to the case of Winslow, and to inform you that I have to-day telegraphed to Mr. Fish, in accordance with your suggestion.

I have the honor, &c.,

WICKHAM HOFFMAN.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, *May 26, 1876.* (Received May 26, 1876.)

Lord Derby refers to your eight-sixty-four as regards treaties with certain foreign powers; also to article three of draught treaty lately discussed, to which article he says you gave your assent, and requests me to ask by telegraph if my Government, to meet present difficulty, will add this article to treaty of forty-two. In this case Sir Edward Thornton will be instructed to sign it at once.

HOFFMAN.

Mr. Fish to Mr. Hoffman.

[Telegram.]

WASHINGTON, *May 27, 1876.*

Your telegram received. Thornton has read to me one from Lord Derby, stating that you had proposed to him the negotiation of the additional article.

You will please inform me immediately whether the suggestion proceeded in the first instance from you or from him, and if from him, how far you may have encouraged it.

FISH, *Secretary.*

Memorandum of a conversation between Sir Edward Thornton and Mr. Fish, at the Department of State, Saturday, May 27, 1876.

Sir Edward Thornton read a telegram from Lord Derby, stating in substance that Mr. Hoffman, the United States *chargé* in London, had suggested to him that an additional article to the treaty of 1842 might be negotiated, and he (Lord Derby) thereupon proposed an article similar to the 3d article of the *projet* of a treaty which was under consideration between Sir Edward Thornton and Mr. Fish in June, 1873, which proposed to restrict the trial of a surrendered fugitive to that for the specific crime for which he may have been surrendered, and to which article he said Mr. Fish had proposed an amendment prescribing the time within which the fugitive might be at large after trial or discharge, before he could be arrested for trial on another offense, and during which he should be at liberty to return to the country by which he had been surrendered. That if this proposal be accepted by the United States, he (Lord Derby) would sign the new article in London with Mr. Hoffman, or Sir Edward Thornton would be authorized to sign it here with Mr. Fish.

Mr. Fish, in reply, expressed regret and surprise that Mr. Hoffman should have made any suggestion on the subject, and assured Sir Edward Thornton that Mr. Hoffman had no authority from his Government to make or to entertain any such proposition or suggestion, but that he was strictly limited to the conveyance of specific instructions from his Government so far as relates to any question affecting the construction of the extradition treaty between the two governments, and Mr. Fish requested Sir Edward Thornton to assure Lord Derby to this effect. Mr. Fish added that he endeavors to give Mr. Hoffman instruc-

tions on that particular question which should be read to Lord Derby, and not to leave anything for oral representation or oral discussion, in order to avoid the possibility of any misapprehension from telegrams or other cause.

With regard to the proposition for negotiating an additional article to the treaty of 1842, he remarked that although he might have been willing in the negotiation of 1873 to have inserted the article now proposed, in a treaty which gave to the United States the improvements which it desired in the treaty of 1842, of a larger list of extradition crimes and other advantages, it could not be expected that the United States would now accept the limitations and restrictions upon what it holds to be its rights under the treaty without obtaining any of the advantages for which such limitations might have been accepted.

That the United States is extremely anxious to reach a satisfactory settlement of the difficulties which have been interposed in the execution of the treaty, but that the proposed article would impose upon the United States the limitation which it denies to exist under the treaty, and would secure no one advantage which it desired, and no improvement upon the treaty of 1842.

And, further, that in view of the argument which has been advanced by the British government, of the controlling force of the act of Parliament over all treaties or arrangements for extradition made by Her Majesty's government subsequent to its enactment, it might be claimed, and possibly not without some force, that an article in amendment or additional to the treaty of 1842, would bring that treaty under the operation and control of the act, which this Government denies to be the case, and cannot consent to. It would be admitting away one of the grounds on which the United States stands.

He referred to what he considered defective features in the British act of 1870, which he thought made it unequal in its provisions as to the British and to the foreign governments, and as wanting in reciprocal powers and rights.

He further said that he thought it unwise to attempt to patch up the treaty of 1842; that the present would not be a propitious moment for such efforts; and that whenever anything is attempted in the way of altering that treaty, it would require a more general revision, and especially an enlargement of the list of extradition crimes.

Mr. Fish added that the United States would not object in any negotiation to be hereafter entered upon, that a treaty should provide to the effect that a surrendered criminal shall not be tried for any crime or crimes other than such as are of the class enumerated in the treaty as extradition crimes, nor be tried for any political offense.

In this connection he referred to the treaty negotiated in 1852 between Great Britain and France, (signed by Lord Malmesbury and Count Walewski,) which contained a provision to that general effect.

And upon Sir Edward Thornton observing that the act of 1870 would prevent the British government from agreeing to such a stipulation, Mr. Fish asked whether Her Majesty's government could not obtain from Parliament a special enabling or ratifying act for the particular treaty which might be negotiated between the two countries.

Mr. Fish further said that with such provision in a treaty, and with the similarity of feeling of the two governments and of their people on the question of political asylum, a full protection would be secured against the trial of a surrendered fugitive for any political offense; and that the violation of such provision by either of these two governments was not within the reach of contemplation, but, should it occur, it would

lead to the denunciation of the treaty by the surrendering state, which would also be at liberty to hold the offending state to its responsibilities for violating a treaty engagement; the treaty would be broken by an act in violation of its terms; whereas if the state on which the demand for surrender is made decide that such demand, being made (as it must be) for one of the extradition offenses, is really designed to bring the fugitive to trial for a political offense, and refuses surrender on that ground, it would be an imputation upon the good faith of the request, and upon the integrity of the demanding state, which would justly give rise to resentful feelings, and would equally lead to a denunciation of the treaty by the state whose requisition has been refused, and whose honor and integrity has been questioned, and in this case the treaty would fail, not for an act done, but for the questioning of the good faith of one of the parties.

HAMILTON FISH.
EDWARD THORNTON.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, May 28, 1876.

In conversation with Tenterden about future negotiations for a new treaty and difficulties in the way, I suggested that if we could not agree upon all the terms of a new treaty, we might amend old treaty by adding to it the articles upon which we were agreed. Suggestion as regards Winslow proceeds entirely from British government.

Reported substance of conversation by mail Saturday.

HOFFMAN.

Mr. Fish to Mr. Hoffman.

[Telegram.]

WASHINGTON, May 28, 1876.

Your suggestion was unauthorized and is regretted and disapproved. You are to receive any representations or information on the subject of the treaty, or of pending difficulties, and report them here, but to abstain from discussion or suggestion unless under specific instruction. All negotiation on the extradition question will be conducted here.

Should Winslow be given up, you will perform the appropriate duties, but say nothing to compromit this Government, or to further embarrass the general question.

FISH, *Secretary.*

Mr. Hoffman to Mr. Fish.

No. 99.]

LEGATION OF THE UNITED STATES,
London, May 27, 1876.

SIR: Referring to my telegram of last evening in the matter of Winslow, I have the honor to forward to you herewith a copy of the note of Lord Derby upon which it was based, and which I received late yesterday afternoon.

With regard to the "suggestion made by me in conversation," it is proper to state that, calling on Lord Tenterden, to ascertain what had taken place in connection with the last remand of Winslow, the conversation turned upon a new treaty and the difficulties in the way of negotiating it, when I observed "that if we should be unable to make a new treaty why should we not amend the old one upon the points upon which we are agreed. We have got along very well under it for thirty years, and with two or three amendments there is no reason why we should not get along under it for many years more."

I have the honor to be, with great respect, your obedient servant,
WICKHAM HOFFMAN.

[Inclosure 1 with No. 99.]

Lord Derby to Colonel Hoffman.

FOREIGN OFFICE, *May 26, 1876.*

SIR: With reference to the paragraph in Mr. Fish's dispatch of the 31st of March, in which he states that "in some few treaties between the United States and foreign countries provisions exist that the criminal shall not be tried for offenses committed prior to extradition other than the extradition crime," and to the draught article to the same effect contained in the draught treaty lately discussed between the two governments, to which article Mr. Fish had given his assent, I have the honor to request that you will state to your Government, by telegraph, that Her Majesty's government will be ready at once to meet the suggestion made by you in conversation at the foreign office yesterday, and to sign an additional article to the treaty of 1842, in the words of that draught article, of which a copy is inclosed.

I have to add that this article is identical with the one contained in all the extradition treaties between Great Britain and other countries, mentioned in the accompanying list.

On being informed that the Government of the United States consent to adopt this method of meeting the present difficulty, Her Majesty's government will be ready to authorize Her Majesty's minister at Washington, who has full powers, to sign the additional article with Mr. Fish, or I shall be happy to do so with you, if your Government prefer it.

Her Majesty's government trust that the Government of the United States will see in this proposal, a proof of their sincere desire to maintain a treaty of such importance to both countries.

I have the honor, &c., &c.,

DERBY.

Every extradition treaty concluded by Great Britain with foreign powers since the passing of the act of 1870, contains an article in accordance with section 3, subsection 2, of the act.

The following are the treaties in question:

Austria, 3d December, 1873; Belgium, 31st July, 1872; Brazil, 13th November, 1872; Denmark, 31st March, 1873; Italy, 5th February, 1873; Germany, 14th May, 1872; Netherlands, 19th June, 1874; Sweden and Norway, 26th June, 1873; Switzerland, 31st March, 1874; Hayti, 7th December, 1874; Honduras, 6th January, 1874.

Draught article in proposed extradition treaty with the United States, agreed to by Mr. Fish.

ARTICLE III.

When any person shall have been surrendered by either of the high contracting parties to the other, such person shall not, until he has been restored or had an opportunity of returning to the country from whence he was surrendered, be triable or tried for any offense committed in the other country prior to the surrender other than the particular offense on account of which he was surrendered.

No person shall be deemed to have had an opportunity of returning to the country whence he was surrendered until two months, at least, shall have elapsed after he shall have been set at liberty and free to return.

N. B.—The last paragraph of this article was added by Mr. Fish.

Mr. Fish to Mr. Hoffman.

No. 897.]

DEPARTMENT OF STATE,
Washington, June 8, 1876.

SIR: I have to acknowledge the receipt of your dispatch No. 99, under date of the 27th May last. You state that, calling on Lord Tenterden to ascertain what had taken place in connection with the last remand of Winslow, the conversation turned upon a new treaty, and the difficulties in the way, when you observed "that if we should be unable to make a new treaty, why should we not amend the old one upon the points upon which we are agreed," and added that, with two or three amendments, there was no reason why we should not get along with the treaty for long years to come.

Thereupon, and on the following day, (May 26,) Lord Derby addressed you requesting you to state to this Government by telegraph, the readiness of Her Majesty's government to meet the suggestion made by you in conversation at the foreign office, and to sign an additional article to the treaty of 1842, in the form which was inclosed to you.

It appears, therefore, that in a formal visit to the foreign office you undertook, without instructions, and without attempting even to ascertain the wish of this Government in that direction, to propose to the under secretary of state the negotiation of a new article additional to the treaty of 1842, limiting that treaty in respect to the offenses for which a criminal should be tried to the requirements of the act of 1870, but securing to the United States none of the advantages which the proposed treaty in others of its articles might have given, and practically conceding the claim which Great Britain had made in the case of Winslow as a condition of his surrender.

While you did not appear to have considered the effect of your proposition, Her Majesty's ministers were prompt to see that you proposed to surrender the case and to place this Government, by treaty-concession, in the position which Her Majesty's government had endeavored to induce it to occupy by a stipulation, and were fully alive to the advantage of attaching the act of 1870 to the treaty of 1842, by an additional article, under your suggestion.

Sir Edward Thornton, on the morning of the 27th, read to me a telegram from Lord Derby, stating that you had suggested to him that an additional article to the treaty of 1842 might be negotiated, and thereupon proposing to negotiate the article in question, pursuant to your suggestion, and was informed that any suggestion or proposition made by you on the subject was without the knowledge of this Government, and that you had no authority from your Government to make or to entertain any such proposition or suggestion, and that your conduct in this respect was regretted and disapproved; and he was requested to inform Lord Derby to that effect. It was deemed advisable to make a memorandum of this interview, a copy of which is herewith inclosed.

My telegram to you of the 28th informed you of the impression produced by your action, and instructed you to abstain from any further act which might embarrass this negotiation.

I am, sir, your obedient servant,

HAMILTON FISH.

WICKHAM HOFFMAN, Esq., &c., &c., &c.,

NOTE.—See the memorandum referred to on page 41.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, *June 1*, 1876.

FISH, *Washington* :

Notified by Lord Derby Winslow case finally adjourned until fifteenth instant.

HOFFMAN.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, *June 6*, 1876. (Received June 6, 1876.)

Read 887. Left copy with Lord Derby to-day. Sent him copy of 890. Brent applies for *habeas corpus*. British Government will ask remand until 15.

HOFFMAN.

Mr. Hoffman to Mr. Fish.

[Telegram.]

LONDON, *June 9*, 1876.

Extradition correspondence, Lawrence, Winslow, Brent, Gray, published.

Latest dispatch, Derby to Thornton, May 29.

Yours, May 22, not published.

HOFFMAN.

H. Ex. 173—4

APPENDIX.

COURT OF QUEEN'S BENCH,
November 21, 1872.

EX PARTE BOUVIER. (27 Law Times, §44.)

Habeas corpus.—Prisoner convicted in France. Surrender to authorities under extradition act, 1870, (33 & 34 Vict., c. 52.)

* * * * *

By sec. 27, 6 and 7 Vict., c. 75, among other acts is repealed, "and this act (with the exception of anything contained in it which is inconsistent with the treaties referred to in the acts so repealed) shall apply, (as regards crimes committed either before or after the passing of this act,) in the case of the foreign states with which those treaties are made, in the same manner as if an order in council referring to such treaties had been made, in pursuance of this act, and as if such order had directed that every law and ordinance which is in force in any British possession with respect to such treaties should have effect as part of this act." Affidavits concerning the French law were produced by both sides.

COCKBURN, C. J.: I am of opinion that this rule should be discharged. I rather hesitate to express any decided opinion as to the construction to be put upon the 27th section, although I see plainly what was the intention of the legislature; that is to say, it was intended, while getting rid of the statutes by which the treaties were confirmed, to save the existing treaties in their full integrity and force. This has been probably effected, but is certainly not very clearly expressed. Nothing would have been more simple than to enact that, although it was expedient to repeal the statutes, yet that the treaties should still have full force and effect; instead of which this complicated and obscure language has been adopted. If it were necessary in the present case to decide that point, I should have been prepared to do so, and to declare that the object had been accomplished, though at the same time I should be disposed to advise the government to make the matter safe by amending the act, in case any question might hereafter arise upon it. Upon the second ground, upon which we are asked to discharge the rule, I think there can be no real doubt. By section 3, subsection 2, the statute is to have full force where provision is made by the law of the state demanding the extradition of the criminal, or by arrangement, that the fugitive criminal shall not, until he has been restored, or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the foreign state for any offense committed prior to his surrender, other than the extradition crime proved by the facts on which the surrender is grounded. I consider that the requirements of this provision are satisfied. We are now clearly informed of the practical working of the French law by the affidavit of M. Moreau, referring to the circular which is binding upon the courts of that country. It expressly provides that the criminal who is surrendered in respect of one offense will not be tried for another until he has been restored or has had an opportunity of returning to Her Majesty's

dominions. This view of the French law is confirmed by M. Felix, M. Blondel, and other authors of the highest possible authority. I am satisfied that we must discharge the rule.

BLACKBURN, J.—I have no doubt that it was intended that the old treaties should still have force and effect, and that they should be enforced by the machinery provided under the extradition act 1870. It was not intended to abrogate the old treaties, but I have very serious doubts whether the legislature have effected, by the twenty-seventh section, what was intended. If it was necessary to decide that point, I should desire to take time to consider, but I content myself with saying that it seems desirable that there should be some further legislation upon the subject. But upon the other point I am of opinion that the requirements of section 2, subsection 3, are complied with. The French law does provide that the fugitive criminal shall not be tried for an offense committed prior to his surrender, other than the extradition crime proved by the facts on which the surrender is grounded. When we read the affidavit of M. Moreau and the text-books, this is made clear. The criminal ought, therefore, to be surrendered.

MELLAR, J.—I am inclined to agree with the construction of section 27 suggested by the attorney-general; but I feel some doubt, and it would be advisable to set all doubt at rest by further legislation. Upon the other point I entirely agree with the judgments of my lord and my brother Blackburn.

SUPREME COURT OF CANADA, 1874.

Extradition case.

[Extract from report of judgment.]

IN RE,
ISRAEL ROSENBAUM. }

RAMSAY, Jr.

On demand for extradition by the Government of the United States of America. Before proceeding to adjudicate on the merits of this application, I must dispose of a question raised while the evidence was being taken, the decision of which was reserved till after the final hearing.

The district attorney for the State of New York, being called as a witness by the prosecution, is asked on cross-examination on the part of the prisoner, "Is there any provision in the law of the United States, or in that of the State of New York, prohibiting the trial of the person extradited for any other crime than that for which he is so extradited?"

On the part of the Government of the United States, it is objected that this question is irrelevant; Mr. Kerr, for the prisoner, cites sec. 27 of the extradition act, passed in 1870, (33 and 34 Vict., cap. 52.)

The section in question reads as follows: "The act specifies in the third schedule to this act are hereby repealed as to the whole of Her Majesty's dominions, and this act, (with the exception of anything contained in it which is inconsistent with the treaties referred to in the acts so repealed,) shall apply, (as regards crimes committed either before or after the passing of this act,) in the case of the foreign states with which

those treaties are made, in the same manner as if an order in council referring to such treaties had been made in pursuance of this act, and as if such order had directed that every law and ordinance which is in force in any British possession with respect to such treaties should have effect as part of this act."

This raises the whole question as to what law governs extraditions in Canada, and whether our statute respecting extraditions on the demand of the Government of the United States of America, is repealed, and if not, to what extent it is in force.

The first enactment of section 27 is perfectly simple. It repeals the act under the French treaty, both the acts under the treaty with the United States, the act of giving effect to the extradition convention with the King of Denmark, and act for the amendment of the law relating to treaties of extradition in 1866, (29 and 30 Vict., cap. 121.) The difficulty arises with regard to the construction of the second member of the section.

In order fully to understand the scope of the question raised, it is necessary to observe that by the form of expression used in the previous parts of the act, and notably in sections 2, 4, and 5, it would seem as though it were not intended to apply the act in any degree until the foreign countries with which treaties existed had, either by law or by arrangement with Her Majesty, recognized those principles.

If the statute had gone no further than this the effect of these enactments would have been to sweep away the whole of the imperial acts, giving effect to extradition with every foreign country. This could not have been contemplated, and the necessity of avoiding such a result gives us the key of the second part of section 27, which thus becomes clear.

The act of 1870, except in so far as it is inconsistent with the treaties referred to in the acts enumerated in the third schedule, that is, with the treaties with France, with the United States, and with Denmark, shall apply as if an order in council referring to such treaties had been made in pursuance of this act, and if such order had directed that every law and ordinance which is in force in any British possession with respect to such treaties should have effect "as part of this act."

The effect, then, of these treaties is saved, (1,) for all Her Majesty's dominions; (2,) colonial legislation is saved, but to what extent? Colonial legislation is to be read as part of the act of 1870, and the act of 1870 is only to apply in so far as it shall not be inconsistent with the treaties with France, with the United States, and with Denmark.

I may observe, *en passant*, that the act of 1870 seems to affect section 132 of the British North America act of 1867, by which the parliament and government of Canada is granted "all power necessary or proper for performing the obligations of Canada, of any province thereof, as a part of the British Empire, toward foreign countries, arising under treaties between the empire and such foreign countries." At least it has hitherto been supposed that this section gave the Canadian parliament power to legislate on treaty questions, and it was on this understanding our extradition act of 1869 was passed.

I may further observe that if there had been any order of the Queen or council suspending the operation of the act in Canada, as provided in section 18, all this difficulty would have been avoided, but I am informed officially that no such order exists. I must, therefore, at each step decide what part of our act is, not inconsistent with so much of the act of 1870 as is consistent with the treaties mentioned in the third schedule, that is, the treaties with France, with the United States, and

with Denmark. This may become a very involved operation; but, as the question is now raised, I see no other mode of dealing with it. I am confirmed, too, in the view I take, by the case of Foster, so far as it goes. There it was urged at the last moment that our legislation was repealed by the imperial act of 1870, and this pretension was negatived by the unanimous judgment of the court, and, I may add, I think rightly. In the present case it only requires me to decide whether there is any necessity for the proof of the existence of a special law in the United States to the effect that a prisoner extradited for one offense cannot be tried for another unless he has had an opportunity of leaving the jurisdiction. Is this exaction of the act of 1870 inconsistent with the treaty with the United States? On the part of the prisoner, Mr. Kerr has urged with great ingenuity that the provisions of subsections 1 and 2 of section 3 are not inconsistent with the old treaties, and that they are, therefore, in force; and that, until there is an order in council under section 5 which will of itself settle the fact as to whether subsection 2 has been complied with, the existence of the foreign law or arrangement must be proved. He further says, in support of the proposition that subsection 2, section 3, is not inconsistent with the old treaties, that the trial of a prisoner remanded for any other crime than that mentioned in the demand is a violation of international law.

Notwithstanding the plausibility of this reasoning, it fails to convince me. In the first place, it goes too far; for if it were recognized as a principle of international law that a prisoner extradited could only be tried for the crime for which the extradition took place, it would not have been necessary for the Imperial Parliament to make these provisions, and it would not be necessary to ask this question. I am not, however, aware that it has been laid down in England that a man once within the jurisdiction of English courts could set up the form of his arrest, or the mode by which he came into custody, as a reason for his discharge when accused of a crime. But even were this otherwise, it is not the international law that it is sought to prove, but the special requirements of a new statute.

Now I cannot conceive how a new provision of the act of 1870 could be consistent with the treaties with France, the United States, and Denmark, entered into years before. Being of this opinion, I do not think the 1st and 2d subsections of section 3 can be considered in force until there is an order in council proclaiming them. I am officially informed that there is no such order.

A case of *Bouvier*, Law Journal Reports, vol. 42, part 2, new series, has been cited to establish that though there was no order in council proclaiming that the act of 1870 applied in its entirety to France, that still it was necessary to show by evidence that by the law of France the French government would not try the prisoner for any offense other than that for which the demand in extradition had been made. It seems to me that the case cited does not maintain the proposition. The judges in England did not decide the point raised here. They admit its difficulty and speak of the complicated and obscure language of section 27, and they discharged the rule on the ground that there was evidence that by the law of France the prisoner surrendered cannot be tried for any other offense, and consequently that it was not necessary for the court in that case to interpret section 27. Mellor, J., said, however, that he was inclined to agree with the argument of the attorney-general, which seems to me to express the same view of section 27 which I take. Mr. Kerr insisted strongly that the chief justice, and Mr. Justice Blackburn would not have said that they considered the provision of

subsection 2, section 3, complied with, unless they thought it was in force. But by the context we see clearly that they do not decide whether it was in force or not, but, that if in force, it was complied with. Whether it was in force or not depends on the interpretation of section 27, on which they did not enter. The two points raised by the attorney-general are these: (1.) Subsection 2 is not in force. (2.) If it is its, provisions have been complied with. The court adjudicated on the last point only.

No more recent case in England has been brought under my notice, and there has not been any modification of section 27. Under the circumstances, I may be permitted say that the obscurity of the language of the statute appears to me to result from the complication of the system to be introduced, rather than from any defect of phraseology. Whether that complication is desirable or necessary, I am not called upon to determine. It is sufficient for me to interpret the statute as I find it, and about the question before me I have no doubt or difficulty.

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No. 345.

Mr. Dart to Mr. Cadwalader.

[Extract.]

CONSULATE-GENERAL OF THE UNITED STATES OF AMERICA
FOR THE BRITISH NORTH AMERICAN PROVINCES,
Montreal, April 7, 1876.

SIR: Referring to the negotiations now pending between the United States and the government of Great Britain in reference to the extradition of Winslow, forger, late of Boston, I cannot resist the temptation to give to the Department of State, although it may be of no value, two precedents established by the judges of the Dominion of Canada under the Ashburton treaty. The first arose at the October term of the Queen's Bench, 1863, in this district, when one Henry Martin was sought to be indicted for the crime of arson. The grand jury rejected the bill of indictment. He was then indicted for the crime of attempting to commit arson, upon which he was tried, convicted, and remanded to jail to await sentence. He broke jail before sentence, and escaped to the United States. He was arrested at Saint Albans, Vermont, before Commissioner Houghton, on a charge of an attempt to commit arson, and was discharged because that was not an extraditable offense. He was then charged with arson, and extradited. On the 19th of February, 1864, he was tried before the Queen's Bench for breaking jail, convicted, and sent to the penitentiary for three years, and seven years for an attempt to commit arson, of which offense he had been previously convicted. The point was taken before the court that he had been extradited for the crime of arson, and could not be tried for any other offense. This point was overruled by the judge. The Dominion government was applied to, as well as our own, to release the man on the ground that his conviction was in violation of, or in fraud of, the Ashburton treaty. The McDonald administration sustained the ruling of the judge.

The next case was the Queen against John Paxton, at the October term of the Queen's Bench, in Montreal, 1866. The prisoner was extradited from Chicago for the alleged offense of forgery, and was put upon his trial upon a charge of uttering a forged promissory note, knowing the same to be forged. The prisoner's counsel plead to the indictment, as a matter of fact, the facts above stated; the Crown prosecutor took issue, and a jury was impaneled to try the issue of facts so joined; the jury rendered a verdict that the prisoner was extradited from Chicago upon the alleged crime of forgery. The judge ruled that he could not be tried for any other offence. Upon an appeal, however, to the court of review, a majority of the judges held that the question of fact was immaterial, reversed the decision of the judge at *nici prius*, and ordered the prisoner to plead to the indictment, upon which he was subsequently tried and convicted. (See Lower Canada Reports, volume 10, page 212.)

So far as relates to Canada in 1868 the Dominion government of Canada passed an act giving effect to the Ashburton treaty without the conditions contained in the imperial act, and which is still in force, and the judges here hold that they will extradite a criminal without any guarantee that he shall not be tried for any other offence, waiving, therefore, the argument that the Parliament of Great Britain cannot, by a statute, impose conditions upon a treaty foreign to its provisions, it is claimed that by the imperial act itself its conditions are expressly waived as to those treaties, then in existence, with which the imperial act would be inconsistent.

I have the honor to be, very respectfully, your obedient servant.

WILLIAM A. DART,

Consul-General.

Hon. JOHN L. CADWALADER,

Assistant Secretary of State, Washington, D. C.

No. 348.

Mr. Dart to Mr. Cadwalader.

[Extract.]

CONSULATE GENERAL OF THE UNITED STATES OF AMERICA

FOR THE BRITISH NORTH AMERICAN PROVINCES,

Montreal, April 18, 1876.

Hon. JOHN L. CADWALADER,

Assistant Secretary of State, Washington, D. C.:

SIR: Some months since one Charles Worms was arrested in this city upon a warrant issued by Mr. Justice Ramsay, of the Queen's Bench, charged with the crime of forgery in the city of Philadelphia; a hearing was had, and said Worms remanded for extradition. His counsel sued out a writ of *habeas corpus*, returnable before Chief-Justice Dorion, where a hearing was had, and all the points were raised in the arguments that are now pending, as I understand it, between our own and the British government. The case attracted considerable attention, and our judges all consulted in reference to it. Chief-Justice Dorion decided that Worms should be remanded for extradition; that the imperial act of 1870 did not apply to the Ashburton treaty; and, if it

did apply in terms, it could not be operative against the treaty, and that when the prisoner was in the jurisdiction of the United States he could be tried for any offense. An appeal was taken in Worms's case, to the supreme court of the Dominion of Canada, which does not sit until next June—an appeal in such cases being allowed by the act creating the supreme court, and Mr. Justice Dorion declined to hold that act unconstitutional. The minister of justice, Hon. Edward Blake, was applied to to extradite said Worms, notwithstanding such appeal, and he issued his warrant for that purpose, sustaining, as I understand it, all the points contended for by the American Government in this controversy. Yesterday Worms was surrendered to the American officer, and is now in the United States.

* * * * *

I have the honor to be, sir, very respectfully, your obedient servant,
 WILLIAM A. DART,
Consul-General.

No. 350.

Mr. Dart to Mr. Cadicalader.

[Extract.]

CONSULATE-GENERAL OF THE UNITED STATES OF AMERICA
 FOR THE BRITISH NORTH AMERICAN PROVINCES,
Montreal, April 25, 1876. (Received April 27, 1876.)

SIR: I have the honor to state that, on examining the petition of appeal in case of Charles Worms, that that document does not raise the points material in the discussion with Great Britain. Those points were raised on the argument upon the return to the writ of *habeas corpus*.

* * * * *

I transmit herewith a copy of Justice Dorion's return to the supreme court of Canada in that case.

I have, &c.,

WILLIAM A. DART,
Consul-General.

PROVINCE OF QUEBEC,
District of Montreal:

Extradition case.—Treaty between Great Britain and United States.

On the application of Charles Worms for writ of *habeas corpus*.

Case submitted to the supreme court in conformity with the provisions of the 38th Victoria, chapter 11, and the rules of practice made in pursuance thereof.

The accused, Charles Worms, was arrested upon a warrant issued by the Hon. Mr. Justice Ramsay, on a complaint sworn to by one William L. Newman, a copy of which complaint will be found in the annexed appendix, number 1, upon which the said honorable judge issued his warrant, a copy of which is document No. 11 in the appendix. After the return of the warrant, certain witnesses were examined, orally, copies of whose depositions form part of the appendix, as documents numbered 2, 4, 5, 6, 7, 8, 9.

Documents were also produced purporting to be the copy of a warrant issued in the United States and copies of documents sworn to there, consisting of the deposition of the complainant and of other papers sworn to at Washington before another official, not being the person who issued the warrant. Copies of the latter documents will be found in the appendix, marked "Number 3."

The Hon. Mr. Justice Ramsay committed the said Charles Worms for extradition, and

a copy of his commitment will be found annexed to the writ of *habeas corpus*, which I issued on the fifteenth of February last on the petition of the said Chartes Worms, documents 12 and 13, respectively.

Counsel on both sides were heard before me, on the return of the writ of *habeas corpus* as to the legality and sufficiency of the commitment mentioned in the return, as also the legality of the original complaint, the warrant thereon issued, and the legality and sufficiency of the evidence upon which the said commitment was made.

The points to which my attention was chiefly directed by the objections urged by the counsel for the accused were—

I further held that the imperial act of 1870 was, by section 27 of said act, made to apply to Canada, in so far as its provisions were not inconsistent with existing treaties, with the same effect as if an order in Her Majesty's council had been passed under section 18, declaring said act to be in force in Canada and our local legislation to form part thereof: and that, as section 14 of the act of 1870

DEPARTMENT OF JUSTICE,
Washington, July 16, 1875.

The PRESIDENT:

SIR: I submit for your consideration the following opinion upon the petition of Charles L. Lawrence, referred to me under your direction by the Attorney-General on the 21st of May.

The case stated for your interposition is as follows:

The petitioner is a naturalized citizen of the United States, who having departed from this country without intending to return, while on his way was arrested in Ireland, during the month of March, at the instance of this Government, under the treaty of 1842, and after due proceedings was extradited, and in consequence thereof is now in the city of New York in jail. The only charge against the petitioner that was considered in the extradition proceedings was that he had *forged* the name of one Blanding to a certain bond and oath of entry in the New York custom-house.

The proceedings for extradition were under the British act of 1870.

Immediately upon his arrival in New York the petitioner was arrested, under bench-warrants issued out of the circuit court of the United States for the southern district of New York, upon charges of other forgeries, of conspiracy, &c., that had been committed before his extradition; and since such arrest a *capias* in a civil action, sued out of the same court, for unpaid duties owing to the United States before his extradition, has been served upon him.

Copies of the above-mentioned warrants, &c., are appended to the petition; the civil *capias* being in *assumpsit*, for \$1,386,400 on account of unpaid duties.

The petitioner says that he is advised that his "surrender by the British government, as aforesaid, was made, and by arrangement with the Government of the United States was accepted, subject to the provision of the said act of 1870, which in substance declares that your petitioner shall not, until he has been restored, or had an opportunity of returning to Her Majesty's dominions, be detained or tried in the United States for any offense committed prior to his surrender other than the extradition crime proved by the facts on which the surrender was grounded, and therefore he prays for instructions to the proper officers not to prosecute him further in such civil suit or for any crime other than the identical one upon which he was surrendered, and that he be discharged from arrest under said bench-warrants," &c.

The important question presented by the petitioner, therefore, is as

follows: Supposing a fugitive criminal to have been extradited in April, 1875, from Great Britain to the United States *under the treaty of 1842, and by proceedings taken under the British act of 1870*, does the latter Government recover jurisdiction over him in respect of any act, whether civil or criminal, done before such extradition other than the criminal act for which he was surrendered?

Unless under very special circumstances such a question, in the United States, is in its nature *legal* and not *political*. In other countries this is not so, but here, inasmuch as extradition is generally regulated by treaty, and as treaties are, of themselves, a part of the "supreme law," questions as to the effect of extraditions already accomplished are ordinarily questions of *law*. Questions of law cannot be determined, practically, in *civil cases*, except by the courts in which they are pending. Such questions, however, in *criminal cases pending in courts of the United States*, may receive a practical determination at the hands of the President by an order forbidding them to be further prosecuted.

If the petitioner had been surrendered by the British government because of irregular practices by the agents in his extradition, whereby that government had been misled, a question like the above might become *political* in its nature, and, therefore, cognizable by the Executive. Such practices may be included in the suggestions as to an "arrangement" made in the petition, although I suppose those suggestions to refer, at least mainly, to some *contract* binding the United States, and supposed by the petitioner to be authorized by the British extradition act of 1870.

If, therefore, the petitioner has been surrendered because of conduct upon the part of the agents in his extradition not authorized by treaty and yet involving the United States, in point of good faith and honor as its guarantor, I suppose that it is the political department of the Government that must give effect to such guarantee in all suits that may be brought against him. (See Scott's case, 8 Bam & Cress., 446.)

But if the immunity claimed by the petitioner be derived from a treaty, either taken alone or as modified by a statute of the United States, or an act of Parliament required to enforce it, it seems that its existence for practical purposes is to be determined as to the civil action of which he complains, only by the court in which that action is pending, whilst as to the criminal cases it may be determined either by such court or by the President. However, the President never interferes with a prosecution, unless the question made by the defendant is *plainly* one which will be decided in his favor by the court as soon as a trial can be reached. If there be doubt about that, the Executive leaves it to the judiciary, where such questions more properly belong.

Upon the evidence in the case made by the petitioner, no *political* question whatever arises. There is a total absence as well of proofs as of probability in favor of the suggestions tending in that direction.

The petition places the claim of Lawrence to immunity simply upon the allegation that it is expressly conferred by the British extradition act of 1870, under which were had the proceedings in his case at London. Other grounds, however, are taken in the learned and well considered briefs which have been filed in this behalf, to wit: (1) That such immunity exists in the *very nature* of extradition, under the treaty of 1842 alone. (2) That it is conceded by the United States statute of 1869, ch. 141, (Revised Statutes, sec. 5275;) and, (3) That certain conduct of those who represented the United States in the proceedings for extradition has pledged the Government to allow that immunity.

I have already dealt with the last of these suggestions, but I repeat

that there is no evidence of such conduct, or of any corresponding impression having been received by the British government, or by any of its officials. I have read the proceedings. They took place before Sir Thomas Henry, a distinguished magistrate, (and eminent authority in matters of extradition,) who is credited with having had much to do with framing the act of 1870. Both the United States and the petitioner seem to have been well represented by counsel; the former by Richard Mullens, esq., a prominent member of the English bar, whose special learning in extradition law was recognized by his being called in 1868 to testify before the special committee appointed by the House of Commons to examine and report upon the state of the law of extradition, and also to advise amendments thereto. During those proceedings, nothing occurred beyond the ordinary routine in extradition cases. Whether anything of the sort suggested by the petitioner is to be *implied* from the fact that those proceedings were under the act of 1870 will be examined hereafter.

It is quite as plain that there is nothing pertinent to the claim of the petitioner in the provisions of the United States statute of 1869, ch. 141, sec. 1, (Revised Statutes sec. 5275,) which is in these words:

"Whenever any person is delivered by any foreign government to an agent of the United States for the purpose of being brought within the United States, and tried for any crime of which he is duly accused, the President shall have power to take all necessary measures for the transportation and safe-keeping of such accused person, and for his security against lawless violence, until the final conclusion of his trial for the crimes or offenses specified in the warrant of extradition, and until his final discharge from custody or imprisonment for or on account of such crimes or offenses, and for a reasonable time thereafter, and may employ such portion of the land or naval forces of the United States, or of the militia thereof, as may be necessary for the safe keeping and protection of the accused."

A simple perusal of this act is enough to show that it has no application, direct or indirect, to the case of the petitioner. It certainly intimates that extraordinary attention by the Executive to the party extradited may properly be given, until his final discharge on account of the crime for which he was surrendered, and for a reasonable time thereafter; but attention to what end? The statute answers, to the end of his "safe-keeping," i. e., keeping safe from escape or rescue, and also of his "security against lawless violence," i. e., against mobs or the like. If Congress had intended that the party surrendered should be free during such time from also the ordinary action of the courts, this would have been the place to express it. Their silence is significant.

The above remarks leave for consideration the two principal suggestions by the petitioner: 1, that the British act of 1870 has so qualified the treaty of 1842, in practice, as to confer the immunity claimed upon all who are surrendered by means of its machinery; or, 2, that such immunity arises by necessary implication out of the treaty alone.

At the outset I remark that the act of 1870 has no bearing whatever, for the past or the future, upon *civil suits* brought for causes of action existing previously to the surrender.

Its application in any case is to "offenses" only. Therefore, the suit brought by the United States for unpaid duties will not be further considered under the present topic.

1. In Great Britain, a treaty of extradition is not of itself *law*, but requires legislation to give it effect.

Before 1870, the treaty of 1842 was rendered effective by acts that

were repealed by the act now under consideration, and since then the latter act has been the only one giving it effect. After resorting to that act in order to secure an extradition, of course the United States will give effect to any conditions which it imposes. The importance of ascertaining its meaning is therefore conceded.

That act is one of universal application, intended to supply for all extradition agreements, past or to come, the place of the special acts for each treaty theretofore in use. It refers to such agreements by the terms, *arrangements* and *treaties*; the former is the term usually employed; the latter occurs only in the 27th section. While this act was upon its passage through the House of Commons, the attorney-general, (Collier,) who was partly in charge of it, stated that the word "arrangement" was used to include not only treaties, but future agreements for extradition, less formal than treaties. (Hansard, vol. 202, p. 305.) Theretofore, extradition had been provided for only by treaty. The act affords a definition of the word, "arrangement" in some respects which is sufficient for our purposes. It is an agreement for extradition, that at all events must have gone before the proceedings which it authorizes, and have been published in an *order in council*. The fact that proceedings were taken under the act of 1870, therefore, cannot, as is suggested by the petitioner, either amount to an "arrangement" or have impressed British officials with the belief that there had been an "arrangement."

Again, the act of 1870 is divided into two parts: *one* relating to *future*, and the *other* to *past* agreements for extradition. Except for the twenty-seventh section the act would not apply to the treaty of 1842. As is usual in recent British legislation, it contains a section defining certain terms used therein. One portion of its definition of "fugitive criminal" is, *a person accused of an "extradition crime;"* and it defines "extradition crime" to be *one of the crimes described in the first schedule to this act.*

I call attention to these definitions for the purpose of showing that the provisions of the act (other than in the twenty-seventh section) are predicated upon the existence of relations betwixt Great Britain and the foreign state which avails itself of or is bound by them, *that entitled the latter to ask for a surrender on account of any of the nineteen crimes mentioned in the first schedule, whenever it becomes bound to recognize the immunity now claimed by the petitioner*; that is, excluding as yet all consideration of its twenty-seventh section, this act has no application to the relations of the United States and Great Britain, because these are relations for the surrender of fugitive criminals on account of the seven crimes of the treaty of 1842, and not on account of the nineteen crimes of the act of 1870. Except for the twenty-seventh section, proceedings for extradition by the United States would have continued to be under the acts previously passed to enforce the treaty of 1842.

Take, for example, the clause specially relied upon by the petitioner, viz: "A fugitive criminal shall not be surrendered unless provision is made by law or arrangement that, until he has been restored, or had an opportunity of returning to Her Majesty's dominions, he shall not be detained or tried for any offense committed prior to his surrender, other than the "extradition crime." Under the definition of the terms "fugitive criminal," and "extradition crime," alluded to above, is it not evident that this clause does not apply to the case of one whose character as a fugitive depends, not upon the first schedule of the act of 1870, but upon the tenth article of the treaty of 1842? So, in the second section of the act, by which its provisions are confined to cases where an ar-

rangement has been made for the surrender of "fugitive criminals," if the *definition* be applied to that term, it is apparent that cases in which the first schedule does not apply do not, under its general provisions, come within the act.

The twenty-seventh section, therefore, is of great importance in this discussion. After expressly repealing the acts which theretofore gave effect to the treaty of 1842, that section provides as follows: "And this act (with the exception of anything contained in it which is inconsistent with the treaties referred to in the acts so repealed) shall apply (as regards crimes committed either before or after the passing of this act) in the case of the foreign states with which these treaties are made." That is, in applying the previous parts of the act to (say) the treaty of 1842, this section omits from such application anything in the act inconsistent with the treaty. In other words, the immunity claimed by the petitioner must be referred to the treaty considered alone, inasmuch as in all cases of difference between them the treaty controls the act, and not the act the treaty.

It is not too much to say that this is as it should be; for admitting the power of Great Britain by an act passed in 1870 to change a treaty contract made in 1842, it is not pleasant to conclude that such power has been exercised. For in such case the change has been made *without notice* to the United States; a circumstance which, in connection with the treaty of 1842, (expressly providing, as that does, for its own avoidance by short notice from either party,) might involve not only a want of courtesy toward the United States, but a want of that perfect good faith which the petitioner very properly desires to be observed by the United States toward Great Britain. There has been in this case no want of perfect good faith upon the part of either government or upon that of the officials of either; but it is apparent that if the case of legislation by Great Britain and of proceedings by the United States had been as conceived by the petitioner, reclamations by the former government against the latter on the score of ill-faith might be attended with special complications.

The view taken above as to the 27th section is confirmed by the language of the Court of Queen's Bench in Bouvier's case. (27 Law Times Rep., 844; 42 Law Journal Rep., Common Law, 17; 12 Cox Cr. Cas., 303.) Bouvier was a French fugitive, demanded in 1872, under the extradition convention of 1843 between France and Great Britain, effect to which had, before 1870, been given by the same acts that had given effect to the treaty of 1842.

The treaty contained no clause granting immunity, but the proceedings against Bouvier had been taken under the act of 1870. The case therefore is so far on all fours with the present. During the proceedings (in the island of Jersey) a suggestion by the fugitive that upon surrender he might be tried in France for old offenses other than the extradition crime, was met by proof that by the French domestic law he could be tried only for that crime. In the Queen's Bench the attorney-general, (Coleridge,) who represented the French government, on that part of the case relied not only on the above proof, but also greatly upon the point that that restriction upon jurisdiction over fugitives did not by the 27th section apply to the convention with France. The proof rendered it unnecessary to decide the latter point, as in either event Bouvier would be surrendered; but the court (Cockburn, Blackburn, and Mellor) conceded that Parliament had *intended* so to provide, and inclined to think that their words had effected such purpose. They, however, suggested further legislation to clear up the doubt; but al-

though an amendatory act has since been passed. that point was left untouched. We may suppose that the attorney-general, as member of Parliament, differed with the judges upon the necessity of amending language which as one of the introducers of the bill he had probably closely considered in 1870. Indeed, it seems that if that language was sufficient to draw from the lord chief justice the expression, "*I see plainly* that was the intention of the legislature—that is to say, it was intended while getting rid of the statutes by which the treaties were confirmed to save the existing treaties *in their full force and effect*," (Bouvier's case, L. T., p. 846,) it is sufficient for all purposes.

The earnestness with which the distinguished counsel for Lawrence has pressed the suggestion that what the court in Bouvier's case were in doubt about was whether the convention with France had not been *abrogated entirely*, and not whether it had *been saved in its full force and effect*, renders it necessary to say that this cannot be so; because Bouvier was *demanded* under the convention, and the court had no hesitation in ordering his surrender. To make his surrender possible, it was necessary not only that there should be a machinery-act like that of 1870, but also a treaty, or an arrangement authenticated by an order in council. The report states that there was in existence no other convention for extradition on which the surrender could be based.

I conclude that the British extradition act of 1870 has no bearing upon the question raised by the petitioner.

II. I come now to consider whether the treaty of 1842 taken, alone, warrants the petitioner in his claim for immunity.

It is not contended that the treaty confers that immunity expressly. As is well known, the extradition provision therein is one of great simplicity, and specifies no more than that the two governments will thereafter, upon due requisition, mutually "deliver up to justice all persons who being charged with the crimes of murder, or assault with intent to commit murder, or piracy, or arson, or robbery, or forgery, or the utterance of forged paper, committed within the jurisdiction of either, shall seek an asylum or shall be found within the territory of the other." Therefore the only question remaining is, whether, when the treaty was made, the parties thereto understood that after surrender fugitives would be liable only for the crime made out in the proceedings therefor. Such understanding might appear in the correspondence between the negotiators of the treaty, or the debates in Congress and Parliament, or in subsequent action by courts in cases affecting persons surrendered.

No reference to the present topic is contained in such correspondence or debates, or, as I am informed, in any subsequent diplomatic correspondence between the two Governments; and the decisions of the courts in the two countries, so far as they can be traced, are (without an exception) to the effect that fugitive criminals are *not* entitled to such immunity.

It is to be remarked that the language of the treaty is probably that of the American negotiator, Mr. Webster, a gentleman familiar with the practice in cases of surrender of fugitives from justice between the States, and desirous that, as to the offenses named in the treaty, that practice should be extended especially to fugitives escaping beyond the long neighboring Canada line. The simple, pregnant expression in the treaty, requiring fugitives to be delivered "*to justice*"—neither more nor less—was probably suggested by the parallel expression in the Constitution, which describes those who are to be surrendered between the States as those who flee "*from justice*." The opinion of Judge (afterwards Mr. Justice Nelson) in *Williams vs. Bacon*, 10 Wendell, 636, ex-

presses briefly what I believe has been the uniform American doctrine upon this subject. In that case, a fugitive had been surrendered (by Massachusetts to New York) on a charge of obtaining goods by false pretenses. After surrender he was arrested in a civil suit. On moving for his discharge from arrest, *as being a breach of public faith*, his counsel said: "On the requisition of the governor of this State, he has been delivered up by the governor of another State to answer to a criminal charge—not to be subjected to arrests here on civil process." To this Judge Nelson said: "There is no pretense that the criminal proceeding in this case was a mere pretext to bring the defendant within the jurisdiction of the court for the purpose of proceeding against him *civiliter*. The argument of the defendant's counsel in this particular is not supported by the facts of the case. Had such facts appeared, the defendants would have been discharged. As it is, the motion is dismissed, with costs."

I believe that it will not be disputed that according to American domestic international law, fugitives *from justice*, when *bona fide* returned to justice, are returned to it without any qualifications arising out of the fact that they had almost succeeded in committing a fraud upon its jurisdiction by flight. I say when *returned bona fide*, because it is beyond doubt that no jurisdiction can arise, in case the government which made the surrender have been induced to do so by deceit. I will add that the recognition of the above rule of jurisdiction, in the relations of so many intelligent, well-ordered communities, affords a strong presumption that it is not immoral, or in any sense contrary to first principles; and also that as the relations between foreign governments become more and more free from collateral obstructions, (one of which I shall mention before I conclude,) this will become more and more the rule in all extraditions.

The cases in which American courts have held that persons surrendered under the treaty of 1842 were liable for other offenses than the extradition crime, are those of Caldwell (8 Blatchford, 131) and Burley, (Clarke on Extradition, 2d ed., p. 90, N.; also, Report of British Extrad. Comm., 1868, pp. 53 and 60.) In *Adrianse vs. Lagrave*, (American Law Register, May, 1875,) the court of appeals of New York held the same doctrine as to a fugitive arrested in a civil suit, although the extradition was discredited as having been "ostensibly" for a crime.

The above are the only American cases on this subject which I have met; that of *Sanford vs. Chase*, 3 Cowen, 381, cited by the petitioner, is not in point.

Resting upon the above uncontradicted practice and decisions, as proof that it is the universal understanding of the authorities in the United States, that fugitives, when surrendered to justice, without more being said, are surrendered thereto generally, absolutely, and simply, I will now inquire whether the British doctrine differs therefrom.

The special extradition committee of the House of Commons referred to above, consisted of eighteen persons, among whom were some of the most distinguished public men of the empire, viz: Messrs. Bouverie, Layard, Walpole, W. E. Forster, Stansfield, J. S. Mill, Sir Francis Goldsmid, Sir R. P. Collier, and the solicitor-general.

Their labors issued in the enactment of the law of 1870. In order to obtain particular information upon the topic of extradition they summoned before them, and examined as experts, Sir Thomas Henry, E. A. Hammond, (the permanent under secretary of state for foreign affairs,) Mr. Mullens, and others. I have looked carefully through the proceedings and report of the committee. The evidence taken by them is re-

ported at length. At the time of his examination, Mr. Hammond had been in public office continuously for forty-five years, and had been under secretary since 1854. I think that it must be conceded that any statement by him of the English view of the matter, especially when acquiesced in by the eminent men of various shades of political belief, before whom it was made, must be accepted as correct. Mr. Hammond called the attention of the committee to Burley's case (cited above) as one in which an American court had proceeded to put a fugitive surrendered by Great Britain upon trial for an offense other than the extradition crime, and stated that whilst it was pending the matter had been referred to the law-officers of the Crown, and that they had held that he might be so tried; at another point he expresses his own personal opinion as being to the same effect. (Questions 1032 and 206.) The former passage in his evidence is as follows: "The question was referred to the law-officers in this country, and it was held that if the United States put him *bona fide* on his trial for the offense in respect of which he was given up, it would be difficult to question the right to put him upon his trial also for piracy, or any other offense which he might be accused of committing within their territory, whether or not such offense was a ground of extradition, or even within the treaty." No exception was taken to either statement, although several members of the committee made remarks thereupon. I suppose that the requirement therein of a *previous bona-fide trial for the extradition crime*, is due to the circumstance that the case submitted went upon that hypothesis, in which event, of course, the opinion would conform to such special feature. It seems plain, inasmuch as the *bona fides* of the extradition is the important matter, that, in the absence of a treaty rendering a certain sort of evidence thereof exclusively admissible, any pertinent evidence is competent. A previous trial is plain and high, *but not the only*, evidence of *bona fides* in the previous proceedings for extradition.

In the minutes of the committee it is also stated that one Heilbronn having been surrendered by the United States to Great Britain for forgery, and acquitted thereof, was afterward put upon trial by the latter for a *larceny* committed at the same time, and was convicted. (Question 1152, &c.) Paxton's case in Canada is to the same effect. My attention has been called to these and some of the cases cited above by Mr. Clarke's Treatise on Extradition.

A moment's attention to the argument in Bouvier's case (above) will show that the court assumed that previously to the act of 1870, the French treaty of 1843, (and so, of course, the American treaty of 1842,) sanctioned trials for offenses previous to surrender other than the extradition crime.

I understand these cases to be uncontradicted in Great Britain, and therefore that the executive and judicial authorities of that government agree with those of the United States in pronouncing against the existence of the immunity claimed by the petitioner under the treaty of 1842, considered alone.

Upon the whole I am of opinion :

I. That as there has been no promise or conduct by any person who represented the United States in the proceedings for the petitioner's extradition which modifies the operation of the treaty upon his present condition, that condition is here a question of *law*, not of *policy*.

II. Therefore, that the President cannot interfere in the civil suit pending against the petitioner; and

III. That no ground has been laid for an order to discharge the pe-

tioner from further prosecution upon the criminal matters specified in the petition.

Inasmuch as, according to the views of this Government, extradition is wholly a matter of *positive* international law, I have confined the above discussion to the relations *actually* existing betwixt the United States and Great Britain. I have therefore omitted to remark upon the French domestic regulation of 1841, by which this immunity is provided for fugitives extradited to France. For the same cause, it seems unnecessary, except incidentally, to refer to the circumstance that the similar feature in the British act of 1870 is due, not to a conviction that it is proper in itself, but to a desire to prevent all chance that a fugitive may be demanded for one offense and then tried, besides, for an offense in its nature *political*. (Hansard, vol. 202, p. 302; Report Extrad. Comm., question 666, &c.) The reason for inserting so sweeping a provision, to effect an object so limited, may be gathered from the minutes of the committee of 1868. Briefly stated, it is that, as nations differ upon what constitutes a *political* offense, the benefit of the British view thereupon can be secured to fugitives only by providing that they shall be triable for no offenses except such as have been previously scrutinized by British officials.

The provision of 1870 is therefore, so to say, collateral, and announces no general principle in international law.

As the general ideas of *government* and *justice* which prevail in Great Britain and the United States preserve the likeness due to a not remote common origin, nothing, either past or apprehended, has suggested to either party the propriety of putting an end to the extradition agreement of 1842 *by notice*, as provided in the eleventh article of the treaty. This would be a natural and easy step toward the introduction of a stipulation like that in the act of 1870. As regards each other, therefore, these powers prefer the agreement of 1842 to the one last mentioned, which, however, each of them has of late adopted in arrangements with some other states. Until something has occurred to render either of these powers apprehensive that political offenders cannot be protected against the other, unless by restricting jurisdiction to the extradition crime, the rule of the treaty of 1842 will probably remain in force. In the mean time, that upon a proper occasion the Government of the United States will either suggest or will consent to such a restriction is shown by its recent treaties with Italy, 1867, and Nicaragua, 1868. (Statutes at Large, vol. 15, p. 629, and vol. 17, p. 815.)

I am, sir, very respectfully, your obedient servant.

S. F. PHILLIPS,
Solicitor-General.

[Extract.]

United States circuit court, southern district of New York.

THE UNITED STATES }
vs. }
CHARLES L. LAWRENCE. }

MARCH 27, 1876.

BENEDICT, J.:

This case comes before the court upon a demurrer interposed by the Government to a rejoinder filed by the defendant.

The proceedings commence with an indictment, charging the accused with several offenses—all being forgeries—alleged to have been com-

mitted within the jurisdiction of this court, and all by statute offenses against the United States. * * *

In disposing of the questions argued before me upon this demurrer, I first notice the position taken that all extradition proceedings by their nature secure to the person surrendered immunity from prosecution for any offense other than the one upon which his surrender is made.

This question is not open in this court. It was decided in *Caldwell's case*, (8 Bla., p. 131.) That determination has since received strong support from the decision of the court of appeals in this State, in *Adriance vs. Lagrave*, (59 N. Y., p. 115,) where the existence of any such immunity was denied in a civil case, and it should be noticed that the present circuit judge of this circuit took part in the decision of the court of appeals, being then a member of the court. This ground of defense is therefore dismissed with the remark that an offender against the justice of his country can acquire no rights by defrauding that justice. Between him and the justice he has offended, no rights accrue to the offender by flight. He remains at all times and everywhere liable to be called to answer to the law for his violations thereof, provided he comes within the reach of its arm.

But here it has been contended that the accused has such immunity by reason of the provisions of the treaty of 1842, under which his surrender was made, which it is correctly said is a law of the United States, binding upon the courts.

The decision of *Caldwell's case* is decisive of this question also, for *Caldwell* was surrendered under the treaty of 1842. But as no argument was made in *Caldwell's case* based upon the provisions of this particular treaty, the argument now made in support of this construction of the treaty may properly now be examined.

At the outset, let it be noticed that no language is used in the treaty which can be supposed to confer the immunity here claimed. On the contrary, the language of the treaty is calculated to repel the idea, for it declares that the offender shall be "delivered up to justice." A significant and comprehensive expression, plainly importing that the delivery is for the purposes of public justice, without qualification.

It is, however, argued that both the parties to this treaty have placed a construction upon its provisions which confers the immunity for which the accused contends, and reference is made to acts of Congress of 1869 and of 1848, (U. S. Rev. Statutes, § 5272 to § 5275,) and to the British extradition act of 1870, as supporting the assertion.

The act of Congress of 1848 is a general law intended for the protection of extradited offenders, but the protection it confers is expressly limited to cases of "lawless violence."

It is true that it assumes, as well it may, that the offender will be tried for the offense upon which his surrender is asked, but there are no words indicating that he is to be protected from trial for all other offenses. The absence of any provision indicating an intention to protect from prosecution for other offenses in a statute, having no other object than the protection of extradited offenders, is sufficient to deprive of all force the suggestion that the act of 1848, as a legislative act, gives to the treaty of 1842 the construction contended for by the accused.

So of the act of 1848, the provision of which relied upon is as follows: It shall be lawful for the the Secretary of State to order the offender "to be delivered to such person as shall be authorized in the name and on the behalf of such foreign government to be tried for the crime of which such person shall be so accused, and such person shall be delivered up accordingly."

It does not seem reasonable to suppose that it was the intention of Congress, by the above language, to give a legislative construction to the existing treaty of 1842.

The provision of the act of 1848 is within the broad provision of the treaty, but does not restrict the operation of that provision, and it may be safely assumed that if the intention to limit the effect of or give a construction to that, or if any other treaty had been entertained, assuming such a function to belong to a statute of this character, that intention would have been plainly expressed.

The acts of Congress referred to, therefore, fail to afford a legislative construction of the treaty in the particular under consideration.

It is still more difficult to find support for the doctrine of the defense in the provisions of the British extradition act of 1870.

How can it be that, without any action on the part of the treaty-making power of the United States, the Parliament of England, by a statute of England, passed 28 years after the treaty of 1842, can engraft upon that treaty a provision of immunity not found in the treaty, and which must thereafter be enforced by courts as part of the laws of the United States?

The effect proper to be given by the executive department of the Government to any condition found in an extradition statute of England to which the Government of the United States has assented in any particular case, is not under consideration. Here the question is judicial, and it is whether the British act of 1870, by reason of its subject-matter, becomes a law of the United States, and as such affords a legislative construction of this treaty binding upon the courts of the United States.

Upon such a question no time need be spent, and it is dismissed with the observation that it would appear that the English courts incline to the opinion that the act of 1870 has no effect in England even to limit the operation of the treaty of 1842, as is seen by the opinions delivered in the court of Queen's Bench, in *Bouvier's case*. (27 *Law Times R.*, p. 844.)

The words of the lord chief-justice in that case are, "I see plainly that it was the intention of the legislature, that is to say, it was intended (by the act of 1870) while getting rid of the statutes by which the treaties were confirmed to save the existing treaties in their full force and effect."

Nor is it made to appear that any such construction of the treaty of 1842 has been adopted by the executive department of either Government.

An agreement for such immunity in the present instance is set up by the plea.

But it is competent for the Government of the United States to enter into such an agreement with the government of England in the absence of any provision for immunity in the treaty. And the demand for such an agreement on the one side, as well as the giving thereof on the other, leads to the inference that no such protection is afforded by the treaty itself. A single instance of such an agreement does not, therefore, help the argument.

The understanding of the treaty by the executive department is better shown by the action taken or omitted in the cases that have arisen where there has been no agreement. So in the case of *Heilbronn*, who was surrendered by the United States, upon the request of England, for an extradition crime, a trial was had in England for an offense not provided for in the treaty, without interference by the executive there, and without complaint from the Government of the United States. So, also,

Burley, an offender surrendered by England to this Government, was put upon trial in this country for an offense other than the one upon which he was extradited; and the case being called to the attention of the law-officers of the Crown, it was considered that "if the United States put him *bona fide* upon his trial for the offense in respect of which he was given up, it would be difficult to question the right to put him upon his trial, also, for piracy, or any other offense which he might be accused of committing within this territory, whether or not such offense was a ground of extradition or within the treaty."

No case has been referred to where the right above spoken of has been questioned by the British government. On the contrary, if I am correctly informed such right has not hitherto been denied in England.

As to the effect of the fact of a previous trial for the offense of which the offender was given up, to which allusion is above made, it is plain that such fact is immaterial in determining the judicial question where legal immunity is set up by way of defense in a prosecution for other offenses, however important that fact might be, as evidence of good faith in determining the political question when it arises.

It may be added that the action of the executive department of the Government of the United States, in the cases where extradited offenders have been tried in this country for offenses other than those upon which their surrender had been asked, has a significant bearing upon the legal question under consideration, because, in criminal cases, as distinguished from civil cases, the Executive, by reason of the power to pardon, is not confined to a consideration of the political question alone, but may also act upon a determination of the judicial question.

But it is further said that the British act of 1870 amounts either to an abrogation of the extradition section of the treaty of 1842, or to a modification of the provision, and inasmuch as by the eleventh section the government of Great Britain could at any time abrogate that portion of the treaty, the act of 1870, if considered by the Government of the United States as an abrogation, would have been so declared, and in the absence of such a declaration must be considered to be acquiesced in by the Government of the United States as its construction of the treaty, and becomes a part of the treaty binding upon the courts.

This proposition is answered by what has been already said in regard to the effect of the British act of 1870, and the action of the Government of the United States in the cases which have hitherto arisen.

Moreover, if the action of the two governments and the act of 1870 be given the utmost effect possible in favor of the accused, all that can be extracted from them is an implied engagement to afford protection to persons extradited in pursuance of the treaty from prosecution for causes other than upon which their surrender was asked, which addresses itself to the political not to the judicial department. It is not intended to suggest that such can be their effect, but simply to express the opinion that in any aspect they have no greater effect, and in view of the language of the treaty cannot be relied on as affording a legislative or executive construction of that instrument binding upon the courts.

It may, therefore, without hesitation be declared that the claim of legal immunity here made is without foundation in the treaty of 1842. In support of this conclusion reference is made to the authority of the court of appeals of the State of New York, which high court in Lagrave's case was called on to declare the effect of this same treaty.

* * * * *

PAY AND ALLOWANCES OF OFFICERS ON DUTY AT WASHINGTON SINCE MARCH 4, 1869.

JUNE 10, 1876.—Referred to the Committee on Military Affairs and ordered to be printed.

WAR DEPARTMENT, *June 8, 1876.*

The chief clerk of the War Department, in the absence of the Secretary of War, has the honor to transmit to the House of Representatives, in compliance with the resolution of the House dated January 24, 1876, statement of all pay and allowances of every kind and nature whatever made to the officers of the Army stationed or on duty in the city of Washington since the 4th of March, 1869.

H. T. CROSBY,

Chief Clerk, for and in the absence of the Secretary of War.

Copy of indorsements on House of Representatives resolution offered by the Hon. H. B. Banning, on the 24th day of January, 1876, calling upon the Secretary of War for statement of all pay and allowances of every kind and nature made to officers of the Army, on duty in Washington, since March 4, 1869, giving name and rank of such officers, duties performed by them, &c.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, D. C., February 29, 1876.

Respectfully referred to the Paymaster-General, United States Army, who will please add to the accompanying statement the information herein called for pertaining to his Department, and return the same to this Office as soon as practicable.

E. D. TOWNSEND,
Adjutant-General.

PAYMASTER GENERAL'S OFFICE,
April 8, 1876.

Respectfully returned to the Adjutant-General of the Army.

To his list of names, &c., (7 sheets,) received herewith, have been added the notes and figures covering information which the resolution of the House of Representatives is understood to call for.

The first column of figures exhibits the aggregate of officers' pay proper and subsistence, and the servants' pay, clothing and subsistence received in each case for time prior to July 1, 1870, when the salary system went into operation. To have given the figures of each separate allowance would have required reference to each, of perhaps thirty thousand vouchers, for which months of time would be necessary. Hence the aggregate alone is stated, and the lists accompanied with a

copy of the pay-table for 1869, which indicates the rate of the pay proper, and allowances which make up this aggregate, and the laws, &c., authorizing the same. The second column exhibits the amount received in each case, since June 30, 1870, under the salary basis.

The figures in the third column are the sums of those in the first and second columns, and show the total received in each case for the entire period of service or duty in Washington, as stated in the lists, between March 4, 1869, and January 24, 1876. The fourth and last column exhibits the annual *rate* of pay in each case, and is ascertained by dividing the totals in the third column by the time as given in the lists, and reducing the results to yearly rates. These are, of course, average annual rates for the time stated, which covers in different cases periods of days only or months, or years, and fractions of a year.

The seven sheets are footed separately, and the footings carried to a recapitulation given at the bottom of the last sheet.

Upon this recapitulation I submit the following remarks:

1st. The footing of the "average annual rates," \$755,812.65, must not be misunderstood to exhibit the average amount paid to officers on duty in Washington during any one of the several years embraced in the resolution. It is, on the contrary, the aggregate of the average annual rates of pay of all officers who have served in Washington between March 4, 1869, and January 24, 1876, a period of nearly seven years; the term of such service varying from four days to the entire period stated.

2d. The average amount paid for time served in Washington during any one year of the period in question is \$226,366.80, the result of dividing the total (third column) payments for the whole time by the number of years embraced therein.

3d. If any particular year be taken—1873, for example—the amount actually paid for service in Washington is found to be \$227,728.83. If from this there be separated sums paid for services of a character not connected with the Army, there remains, as paid for duty in behalf of the military establishment, the sum of \$160,632.95.

BENJ. ALVORD,
Paymaster-General, U. S. A.

ADJUTANT-GENERAL'S OFFICE,
Washington, April 11, 1876.

Respectfully referred to the Quartermaster-General, with request that he will cause to be added to the list herewith transmitted so much of the information herein requested as relates to allowances for quarters, fuel, and forage, and return the same to this Office at the earliest date practicable.

E. D. TOWNSEND,
Adjutant-General.

WAR DEPARTMENT,
QUARTERMASTER-GENERAL'S OFFICE,
Washington, D. C., May 31, 1876.

Respectfully returned to the Adjutant-General United States Army, with so much of the information herein required as relates to allowances for fuel, quarters, and forage added.

This report gives the total amount received for quarters, fuel, and forage by officers for the actual time they were on duty in Washington. It will be seen by the accompanying rolls, that the greater number of these officers were not stationed or on duty in this city for the entire period from March 4, 1869, to January 24, 1876, but were serving in

various parts of the country; consequently, to give the "annual pay and allowances of rent, fuel, quarters, and forage in value received by each" for the specified time, would necessitate the examination of the returns of officers of this Department stationed where the different officers might be on duty; and as the issuing and disbursing officers are not always the same, in many instances the money-accounts of the disbursing officer would have to be examined to find the money-value of the fuel and forage, after the amount is issued, had been found.

Furthermore, officers of this Department have been frequently changed in their stations during the time. In such cases, several officers' accounts and returns would have to be examined, to give the value of the allowances to one officer. From the foregoing, it will be seen that all of the requirements of the within letter could not possibly be complied with in any reasonable time.

M. C. MEIGS,
Quartermaster-General, Brevet Major-General U. S. A.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, June 6, 1876.

Respectfully returned to the Secretary of War, inviting attention to the statement herewith transmitted, embracing the information called for by resolution of the House of Representatives dated January 24, 1876.

E. D. TOWNSEND,
Adjutant-General.

PAY AND ALLOWANCES OF CERTAIN OFFICERS.

List of officers of the United States Army on duty or stationed in the city of Washington duties performed, the length of time each has been stationed or on duty in this city, the authority of law under which such allowances and pay have been made; furnished in

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
W. T. Sherman	General of the Army..	Commanding Army of the United States.	Mar. 8, 1869	Oct. 15, 1874
George H. Thomas ..	Maj. gen. U. S. A	Member of the Dyer court of inquiry.	Mar. 4, 1869	May 15, 1869
W. S. Hancock	do	do	Mar. 4, 1869	May 15, 1869
Do	do	Member examining-board under sec. 11, act of July 15, 1870.	Oct. 22, 1870	Jan. 3, 1871
J. M. Schofield * ..	do	Secretary of War	Mar. 4, 1869	Mar. 15, 1869
Irvin McDowell	do	Member of the Howard court of inquiry.	Mar. 10, 1874	May 9, 1874
John Pope	Brig. gen. U. S. A	do	Mar. 3, 1874	May 9, 1874
O. O. Howard	do	Commissioner Bureau Refugees, Freedmen and Abandoned Lands.	Mar. 4, 1869	June 30, 1872
Do	do	Awaiting assignment, settling his accounts, &c.	July 1, 1872	Aug. 6, 1874
Alfred H. Terry	do	Member of the Dyer court of inquiry.	Mar. 4, 1869	May 15, 1869
Do	do	Member examining - board under sec. 11, act of July 15, 1870.	Oct. 17, 1870	Jan. 3, 1871
John A. Rawlins...	Brig. gen. and chief of staff.	Chief of staff to the General of the Army.	Mar. 4, 1869	Mar. 12, 1869
E. D. Townsend....	Brig. gen. and Adj. Gen.	In charge of Adjutant-General's Department.	Mar. 4, 1869	Jan. 24, 1876
Joseph Holt.....	Brig. gen. and Judge Adv. Gen.	In charge of Bureau of Military Justice.	Mar. 4, 1869	Dec. 1, 1875
M. C. Meigs	Brig. gen. and Q. M. Gen.	In charge of Quartermaster-General's Department.	Mar. 4, 1869	June 1, 1875
Amos B. Eaton.....	Brig. gen. and Com. Gen. of Sub.	In charge of Subistence Department.	Mar. 4, 1869	May 1, 1874
Joseph K. Barnes ..	Brig. gen. and Surg. Gen.	In charge of Medical Department.	Mar. 4, 1869	Jan. 24, 1876
Benj. W. Brice	Brig. gen. and Paymaster Gen.	In charge of Pay Department.	Mar. 4, 1869	Jan. 1, 1872
A. A. Humphreys...	Brig. gen. and Chief of Eng.	In charge of Corps of Engineers.	Mar. 4, 1869	Jan. 24, 1876
Alexander B. Dyer..	Brig. gen. and Chief of Ord.	In charge of Ordnance Department.	Mar. 4, 1869	May 20, 1874
Robert Macfeely...	Brig. gen. and Com. Gen. of Sub.	In charge of Subistence Department.	May 10, 1875	Jan. 24, 1876
Richard Delafield..	Brig. gen.; retired	Member of Light-House Board.	Mar. 4, 1869	Feb. 21, 1870
Lorenzo Thomas...	do	Completing Report of Inspection of National Cemeteries.	Mar. 4, 1869	Feb. 21, 1870
R. B. Marcy	Col. and Ins. Gen	In charge of Inspector-General's Department.	Apr. 12, 1869	Jan. 24, 1876
Edmund Schriver ..	do	Inspector of Military Academy and special duty in War Department.	Mar. 4, 1869	Apr. 15, 1871
James A. Hardie	do	President board of claims, War Department.	Mar. 4, 1869	Apr. 30, 1869

* Secretary of War to March 12, 1869, inclusive.

PAY AND ALLOWANCES OF CERTAIN OFFICERS.

5

since March 4, 1869, with a detailed statement of the name and rank of such officers, the annual pay and allowances, of rent, fuel, quarters, forage, in value received by each, and the compliance with the resolution of the House of Representatives dated January 24, 1876.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 24, act of July 15, 1870, sections 1881 and 1882, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$30,192 45	\$57,847 92	\$78,040 37	\$13,922 15	\$17,625 80	\$2,822 50	\$4,774 23	\$25,222 53
1,517 09		1,517 09	7,568 32				
1,299 06		1,299 06	7,341 46	66 30	76 16	115 99	258 35
	1,479 17	1,479 17	7,500 00				
32 45		32 45	5,871 85	67 35		50 42	117 77
	1,229 74	1,229 74	7,500 00				
	898 38	898 38	5,500 00		60 50		60 50
5,440 89	10,921 25						
		27,492 53	5,076 60	5,833 00	1,458 79	3,778 19	11,074 98
	11,076 39						
1,009 21							
	1,586 89	2,586 10	5,500 00	228 00	80 91		308 91
86 12		86 12	3,897 48	22 93	18 96	60 14	102 03
5,886 26	30,582 41	36,468 69	5,293 80	7,461 00	1,886 72	3,532 87	12,880 59
5,163 78	29,772 92	34,938 70	5,182 50	7,281 00	2,065 79	2,257 27	11,604 06
5,855 62	27,022 92	32,878 54	5,267 58	6,921 00	1,632 20	4,269 84	12,823 04
6,131 50	21,064 58	27,196 08	5,272 26	5,679 00	1,401 19	2,312 00	9,392 19
5,757 90	30,582 64	36,340 54	5,275 24	7,533 00	1,889 33	4,468 54	13,890 87
5,579 74	8,231 20	13,810 94	4,820 80	3,051 00	816 66	2,037 07	5,904 73
5,993 51	30,582 64	36,576 15	5,309 40	7,533 00	1,853 95	4,771 65	14,158 60
5,855 62	21,354 86	27,210 48	5,224 32	1,971 00	1,407 08	3,278 76	6,656 64
	3,690 55	3,880 55	5,550 00	762 00	154 94	416 60	1,333 54
4,674 72		4,674 72	4,233 74	1,041 00	336 61	434 00	1,811 61
4,547 59		4,547 59	4,703 47	1,041 00	306 44	836 81	2,184 25
4,118 12	25,022 92	29,141 04	4,295 83	6,894 00	1,143 65	1,188 67	9,226 32
4,059 37	3,547 92	7,607 29	3,603 45	2,286 00	646 79	829 75	3,762 54
505 92		505 92	3,169 31	171 00	82 22	103 74	362 96

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
W. McK. Dunn	Col. and asst. judge adv. gen.	On duty in War Department	Mar. 4, 1869	Dec. 1, 1875
Do.....	Brig. gen. and judge adv. gen.	In charge of Bureau of Military Justice.	Dec. 1, 1875	Jan. 24, 1876
A. E. Shiras.....	Col. and asst. com. gen. of sub.	Assistant to Com. Gen. of Subsistence.	Mar. 4, 1869	May 1, 1874
Do.....	Brig. gen. and Com. Gen. of Sub.	In charge of Subsistence Department.	May 1, 1874	Apr. 14, 1875
Charles H. Crane....	Col. and asst. surg. gen.	Assistant to Surgeon-General.	Mar. 4, 1869	Jan. 24, 1876
William Maynadier.	Col., Ordnance Department.	Assistant to Chief of Ordnance.	Mar. 4, 1869	July 3, 1871
Albert J. Myer.....	Col. and Chief Signal-Officer.	In charge of Signal-Office ..	Mar. 4, 1869	Jan. 24, 1876
Justin Dimick	Col.; retired.....	Witness before Dyer court of inquiry.	Apr. 14, 1869	May 15, 1869
Charles Thomas	do	Assistant to Quartermaster-General.	Mar. 4, 1869	Apr. 9, 1869
Robert Allen.....	Col. and asst. q. m. gen.	do	May 27, 1870	May 10, 1873
Benjamin Alvord ..	Col. and Paymaster Gen.	In charge of Pay Department.	Jan. 1, 1872	Jan. 24, 1876
Steward Van Vliet.	Col. and asst. q. m. gen.	Assistant to Quartermaster-General.	Nov. 12, 1875	Jan. 24, 1876
Rufus Ingalls.....	do	In charge of Quartermaster's Department.	June 1, 1875	Jan. 24, 1876
John C. Kelton.....	Lient. col. and asst. adj. gen.	Assistant to Adjutant-General.	Mar. 4, 1869	July 21, 1870
Robert Williams ..	do	do	Mar. 4, 1869	Apr. 1, 1870
Do.....	do	Temporary duty in Washington.	May 2, 1874	Aug. 26, 1874
J. C. McFerran.....	Lient. col. and dep. q. m. gen.	Depot quartermaster	Mar. 4, 1869	Mar. 31, 1870
James A. Ekin.....	do	Assistant to Quartermaster-General.	Mar. 4, 1869	Apr. 1, 1870
Charles Sutherland.	Lient. col. and asst. medical purveyor.	In charge of Medical Purveyor's Office.	Mar. 4, 1869	June 30, 1870
J. H. Baxter	do	Compiler Medical Statistics of the late Provost-Marshal-General's Bureau.	Mar. 4, 1869	June 23, 1874
Do.....	Col. and chief medical purveyor.	Compiler Medical Statistics of the late Provost-Marshal-General's Bureau and assistant to the Surgeon-General.	June 23, 1874	Jan. 24, 1876
Israel C. Woodruff.	Col., Corps of Engineers.	Assistant to the Chief of Engineers.	Mar. 4, 1869	June 14, 1870
John D. Kurtz	Lient. col., Corps of Engineers.	Assistant to the Chief of Engineers and in charge of defenses of Washington, &c.	Mar. 4, 1869	Mar. 31, 1870
John G. Foster	do	Assistant to the Chief of Engineers.	May 14, 1872	June 1, 1874
Roger Jones	Lient. col. and asst. insp. general.	Settling his accounts with the Treasury Department.	Jan. —, 1873	Mar. —, 1873
Alex. Montgomery.	Lient. col. and dep. q. m. gen.	do	Oct. 15, 1873	Jan. 15, 1874

PAY AND ALLOWANCES OF CERTAIN OFFICERS.

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in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 84, act of July 15, 1870, sections 1261 and 1262, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$3,649 08	\$21,746 45	\$25,395 53	\$3,766 92	\$6,975 00	\$1,822 44	\$1,972 23	\$1,079 67
4,476 64	17,235 42	21,712 06	4,209 12	6,693 00	1,904 53	1,915 30	10,512 83
.....	5,240 25	5,240 25	5,500 00	.....	.....	.....	.....
4,062 86	25,022 92	29,085 78	3,738 34	7,533 00	1,809 80	2,367 32	11,730 12
4,614 62	4,508 42	9,124 04	3,912 80	2,511 00	678 72	835 97	4,025 69
3,868 47	25,022 92	28,891 39	3,710 04	7,533 00	1,796 45	2,384 28	11,713 73
227 15	.....	227 15	2,732 09	.....	.....	.....	.....
351 08	.....	351 08	3,689 89	117 00	66 16	.....	183 16
311 26	12,847 92	13,159 18	4,455 65	3,270 00	703 17	1,020 65	4,993 82
.....	12,287 50	12,287 50	4,500 00	4,410 00	833 90	1,394 35	6,638 25
.....	900 00	900 00	4,500 00	216 00	53 14	60 17	329 31
.....	2,912 50	2,912 50	4,500 00	702 00	152 70	210 02	1,064 72
3,560 41	208 61	3,769 02	2,724 14	1,216 80	386 55	179 17	1,782 52
2,869 69	.....	.....	.....	.....	.....	.....	.....
.....	1,266 66	4,136 35	3,138 78	712 80	344 86	301 91	1,359 57
3,105 70	.....	3,105 70	2,886 49	928 80	334 47	435 02	1,698 29
2,665 53	.....	2,665 53	2,478 24	928 80	334 74	429 36	1,692 90
127,471 43	451,947 87	579,419 30	197,982 12	127,221 48	31,369 02	53,042 29	211,632 79
3,560 40	.....	3,560 40	2,686 28	1,144 80	348 89	97 14	1,590 83
3,183 82	13,969 78	23,716 93	3,442 77	6,497 00	1,548 29	2,310 44	10,355 73
.....	6,563 33	.....	.....	.....	.....	.....	.....
3,833 47	.....	3,833 47	2,998 33	1,108 80	380 88	455 70	1,945 38
3,113 56	.....	3,113 56	2,894 34	928 80	334 74	169 39	1,422 93
.....	8,188 88	8,188 88	4,000 00	1,930 80	395 57	677 57	3,003 94
.....	1,000 00	1,000 00	4,000 00	.....	.....	.....	.....
.....	1,000 00	1,000 00	4,000 00	216 00	13,21	46 15	275 36

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Charles E. Blunt ...	Lieut. col. Corps of Engineers.	Assistant to the Chief of Engineers.	July 1, 1873	Oct. 2, 1873
Thomas M. Vincent	Major and asst. adj. gen.	Assistant to the Adjutant-General.	Mar. 4, 1869	Jan. 24, 1876
Samuel Breck	do	do	Mar. 4, 1869	June 5, 1870
Louis H. Pelouze	do	Special duty in War Department.	Mar. 4, 1869	May 31, 1869
Do	do	Assistant to the Adjutant-General.	Dec. 3, 1873	Jan. 24, 1876
George K. Leet	do	Special duty in War Department.	Mar. 4, 1869	Mar. 1, 1870
Joseph H. Taylor	do	A. A. G., headquarters Department of Washington.	Mar. 4, 1869	Apr. 30, 1869
De Witt Clinton ...	Major and judge-advocate.	Member board of claims.	Mar. 4, 1869	Apr. 30, 1869
William Winthrop	do	Assistant to the Judge-Advocate-General.	Mar. 4, 1869	Jan. 24, 1876
Edgar W. Dennis	do	do	Mar. 4, 1869	May 22, 1869
Thomas F. Barr	do	do	Mar. 4, 1869	Apr. 1, 1870
Herbert P. Curtis	do	do	July 12, 1873	Oct. 31, 1873
Tredwell Moore	Major and quartermaster.	Awaiting orders.	Mar. 4, 1869	Apr. 1, 1870
Alex. J. Perry	do	Assistant to the Quartermaster-General.	Mar. 4, 1869	Apr. 1, 1870
James J. Dana	do	do	Mar. 4, 1869	May 8, 1870
Beekman Du Barry	Major and com. of sub.	Assistant to the Commissary-General of Subsistence.	Mar. 4, 1869	Nov. 4, 1873
George Bell	do	Depot commissary of subsistence.	Mar. 4, 1869	Jan. 24, 1876
Lewis A. Edwards	Major and surgeon.	Chief medical officer Bureau R., F., and A. L.	Mar. 4, 1869	Apr. 30, 1869
Basil Norris	do	Attending surgeon.	Mar. 4, 1869	Jan. 24, 1876
Joseph H. Eaton	Major and paymaster.	Assistant to the Paymaster-General.	Mar. 4, 1869	July 6, 1874
William G. Moore	do	Awaiting assignment to station.	Mar. 4, 1869	Apr. 30, 1869
William R. Gibson	do	Paying deferred claims.	Mar. 4, 1869	June 30, 1869
John L. Hodge	do	Assistant to the Paymaster-General.	Mar. 4, 1869	Sept. 11, 1871
George E. Glenn	do	Settling his accounts with the Treasury Department.	Mar. 4, 1869	May 31, 1869
Edmund H. Brooke	do	Assistant to the Paymaster-General.	Mar. 4, 1869	June 30, 1870
Isaac S. Stewart	do	Adjusting his accounts with the Treasury Department.	Aug. 19, 1869	Nov. 6, 1869
Thomas L. Casey ..	Maj., Corps of Engineers.	Assistant to the Chief of Engineers.	Mar. 4, 1869	Sept. 1, 1874
Do	Lieut. col., Corps of Engineers.	do	Sept. 2, 1874	Jan. 24, 1876
Nathaniel Micheler	Maj. Corps of Engineers.	In charge of public buildings and grounds.	Mar. 4, 1869	June 1, 1871
John G. Parke	do	Assistant to the Chief of Engineers.	Mar. 4, 1869	Jan. 24, 1876
William P. Craigbill	do	do	Mar. 4, 1869	Mar. 31, 1870
Cyrus B. Comstock ..	Maj. Corps of Engineers, and col. and a. d. c.	A. D. C. to the General of the Army.	Mar. 4, 1869	May 3, 1870

PAY AND ALLOWANCES OF CERTAIN OFFICERS.

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in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 24, act of July 1, 1870, sections 1281 and 1282, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
	\$1,011 11	\$1,011 11	\$4,000 00				
\$3,195 85	18,714 23	21,910 08	3,180 45	\$6,062 40	\$1,696 20	\$1,851 57	\$9,610 17
2,892 13		2,892 13	2,307 24	928 80	378 77		1,307 59
584 75		584 75					
	7,486 11	7,486 11	3,332 16	2,064 00	702 53	826 07	3,592 60
2,184 91		2,184 91	2,203 18	856 80	290 28	361 88	1,508 96
363 51		363 51	2,307 24	136 80	78 03		214 83
349 26		349 26	2,203 18	136 80	78 03		214 83
2,919 98	16,379 25	19,299 23	2,601 50	5,954 40	1,384 35	463 78	7,802 53
705 20		705 20	2,203 18	189 60	83 34	82 20	355 14
2,257 69	832 65	3,090 34	2,424 59	1,144 80	376 56	197 99	1,719 35
2,369 66		2,369 66	2,203 18	928 80	326 41	454 37	1,709 58
1,601 10		1,601 10	1,947 13				
2,593 70		2,593 70	2,411 25	928 80	334 74	430 59	1,694 13
2,724 05		2,724 05	2,307 24	950 40	371 68	191 82	1,513 90
3,299 91	11,685 41	14,985 32	3,211 12	4,024 80	1,064 11		5,108 91
3,195 85	18,720 38	21,916 23	3,181 38	6,044 40	1,469 31	2,242 62	9,756 33
396 00		396 00	2,515 30	136 80	45 52	30 06	212 38
3,195 85	18,904 17	22,100 02	3,208 06	6,044 40	1,890 67	2,028 54	9,893 61
3,529 30	14,038 35	17,567 65	3,293 80	4,351 20	1,148 26	736 41	6,235 87
332 73		332 73	2,089 19	160 03	78 03		238 06
750 71		750 71	2,307 24	260 80	93 03	119 98	493 81
2,919 97	3,346 90	6,266 87	2,483 60	2,060 80	651 36	992 34	3,654 50
533 84		533 84	2,203 23	208 80	85 53	98 02	392 35
508 66		508 66	2,099 19	1,144 80	384 83	578 91	2,108 54
471 42		471 42	2,203 17				
3,195 85	14,063 76	17,279 61					
	5,477 77	5,477 77	3,303 48	5,144 40	1,521 35	2,387 28	9,058 03
3,354 67	2,906 28	6,260 95	2,790 27	2,080 80	638 26	879 89	3,598 95
2,299 90	19,473 61	21,773 51	3,160 62	6,026 40	1,622 30	2,207 50	9,856 20
2,593 68		2,593 68	2,411 23	928 80	334 74	394 43	1,657 97
3,331 12		3,331 12	2,857 29	1,241 40	410 93	241 28	1,893 56

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Orlando M. Poe	Maj. Corps of Engineers.	Engineer secretary of the Light-House Board.	Mar. 4, 1869	Mar. 23, 1870
Do.....	Col. and A. D. C.....	A. D. C. to the General of the Army.	May 14, 1873	Jan. 24, 1876
Do.....	do	Member of Light-House Board.	Jan. 19, 1874	Jan. 24, 1876
Orville E. Babcock.	Maj., Corps of Engineers and col. and supt. public buildings, March 3, 1873.	With the President.....	Mar. 4, 1869	Jan. 24, 1876
Do.....	do	In charge public buildings and grounds, &c.	June 1, 1871	Jan. 24, 1876
Do.....	do	Chief engineer of the Washington aqueduct.	Oct. 13, 1871	Jan. 24, 1876
Stephen V. Benét..	Maj., Ordnance Department.	Assistant to the Chief of Ordnance.	Oct. 22, 1869	June 23, 1874
Do.....	Brig. gen. and Chief of Ordnance.	In charge of Ordnance Department.	June 23, 1874	Jan. 24, 1876
Thos. J. Treadwell.	Maj., Ordnance Department.	Assistant to the Chief of Ordnance.	Mar. 4, 1869	Oct. 18, 1869
Horace Porter	Maj., Corps of Engineers, and col., a. d. c.	With the President	Mar. 4, 1869	Jan. 1, 1873
Wm. D. Whipple...	Maj., asst. adjt. gen...	Assistant to the Adjutant-General.	Aug. 16, 1870	Dec. 31, 1873
Do.....	Col., A. D. C	A. D. C. to General of the Army and asst. adjt. gen., headquarters Army.	Jan. 1, 1873	Oct. 15, 1874
John P. Sherburne.	Maj., asst. adjt. gen...	Before examining-board....	Nov. 12, 1870	Dec. 27, 1870
Henry Goodfellow ..	Maj., judge-advocate ..	Assistant to the Judge-Advocate-General.	June —, 1870	Nov. 30, 1875
Do.....	do	On duty in War Department	Dec. 1, 1875	Jan. 24, 1876
James P. Martin...	Capt., 7th Inf	On special duty at headquarters of the Army.	Mar. 4, 1869	Apr. 23, 1869
Do.....	Maj., asst. adjt. gen...	Assistant to the Adjutant-General.	Mar. 5, 1870	June 7, 1875
J. D. Bingham	Maj., quartermaster ..	Assistant to the Quartermaster-General.	Apr. 2, 1870	Mar. 2, 1875
Do.....	Lieut. col., dep. q. m. gen.	do.....	Mar. 3, 1875	Jan. 24, 1876
Charles G. Sawtelle.	Maj., quartermaster ..	Settling his accounts with the Treasury Department.	June 27, 1870	Sept. 12, 1870
William Myers	do	Depot quartermaster	Apr. 29, 1870	Jan. 24, 1876
M. I. Ludington....	do	Assistant to the Quartermaster-General.	May 19, 1870	Oct. 21, 1875
Wm. B. Rochester ..	Maj., paymaster	Post paymaster	May 28, 1870	Aug. 1, 1872
Nicholas Vedder ..	do	Awaiting orders	June 30, 1870	Sept. 10, 1870
Do.....	do	Paying enlisted men of the Signal Corps.	Feb. 18, 1875	Jan. 24, 1876
Peter P. G. Hall....	do	Settling his accounts with the Treasury Department.	Apr. 13, 1870	July 31, 1870
Do.....	do	Paying volunteer travel-claims.	May 18, 1873	June 19, 1873
Junius B. Wheeler ..	Maj., Corps of Engineers.	Assistant to Chief of Engineers.	Feb. 23, 1870	Oct. 10, 1871

* Major.

in the city of Washington since March 4, 1869, &c.—Continued.

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				Quarters.	Fuel.	Forage.	Total.
\$2,462 58		\$2,462 58					
	\$12,125 00	12,125 00	\$3,878 52	\$2,952 00	\$149 26	\$939 33	\$4,040 59
2,919 97	15,474 27	18,394 24	2,670 12	\$3,466 80 13,132 00	1,570 44	2,328 07	10,497 31
1,825 90	13,911 96						
	8,712 50	24,450 36	3,908 52	4,024 45 1,692 00	1,501 98	3,075 75	10,294 18
79,750 95	234,005 70	313,756 65	113,688 57	87,274 48	23,732 41	27,827 02	138,833 91
1,475 35		1,475 35	2,371 08	612 00	141 39	164 94	918 33
3,662 92	10,426 67	14,149 59	3,699 23	4,051 80	856 54	1,115 42	6,023 76
	16,156 28	16,156 28	3,880 09	4,131 00	995 61	1,471 18	6,597 79
	375 00	375 00	3,000 00				
182 77	16,110 14	16,292 91	2,885 04	4,916 00	1,328 23	2,208 36	8,452 59
935 49	14,791 67	15,727 16	2,916 92	4,810 80	1,150 36	2,116 90	8,078 06
505 50	18,911 26	19,506 76	3,356 80	5,077 20	1,357 33	2,200 13	8,634 66
26 65	631 58	658 23	3,159 50				
333 86	17,712 28	18,046 14	3,146 05	4,577 19	1,347 35	2,120 42	8,044 96
318 80	15,319 88	15,638 68	2,869 48	4,892 40	901 79	1,735 66	7,529 85
203 05	6,013 58	6,216 63	2,858 22	2,088 00	498 46	714 80	3,301 26
6 09	3,319 80	3,325 89	2,949 06	1,024 80	266 88	391 50	1,683 18
477 19	458 68	935 87	2,423 84	488 00			488 00
662 77	4,134 32	4,997 09	3,064 64	1,512 00	343 74	450 61	2,306 35

†Colonel.

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
George H. Elliot...	Maj., Corps of engineers.	Engineer secretary of the Light-House Board.	Mar. 22, 1870	June 1, 1874
Do.....	do.....	In charge of Washington aqueduct.	Mar. 22, 1870	Oct. 13, 1871
Do.....	do.....	Assistant to the Chief of Engineers.	June 1, 1874	Jan. 24, 1876
Rufus Saxton.....	Maj., quartermaster ..	Settling his accounts with the Treasury Department.	Sept. 21, 1871	June 10, 1872
Charles T. Larned..	Maj., paymaster	Assistant to the Paymaster-General.	Sept. 23, 1871	Jan. 24, 1876
Thad. H. Stanton ..	do.....	Post-paymaster	June 14, 1870	Apr. 30, 1871
Do.....	do.....	Paying bounty-claims	July 10, 1872	Nov. 11, 1872
John McL. Taylor..	Maj., com. of sub.....	Assistant to Commissary-General of Subsistence.	Feb. 25, 1872	July 17, 1872
Ebenezer Swift....	Maj., surgeon	Settling his accounts with the Treasury Department.	May 22, 1872	June 22, 1872
Robert D. Clarke...	Maj., paymaster	Post-paymaster	Sept. 8, 1872	Jan. 24, 1876
Francis W. Farquhar.	Maj., Corps of Engineers.	Member of Northern Boundary Commission, preparing for the field.	June 17, 1872	July —, 1872
Amos Beckwith....	Maj., com. of sub	Assistant to Commissary-General of Subsistence.	Apr. 1, 1874	June 22, 1874
Do.....	Lient. col., asst. com. gen. sub.	do.....	June 22, 1874	May 22, 1875
Asa B. Carey.....	Maj., paymaster	Assistant to the Paymaster-General.	July 1, 1874	Jan. 24, 1876
Peter C. Haina.....	Maj., Corps of Engineers.	Engineer secretary of the Light-House Board.	June 2, 1874	Jan. 24, 1876
Samuel N. Benjamin	Maj., asst. adjt. gen....	Assistant to the Adjutant-General.	May 1, 1875	Jan. 24, 1876
Henry C. Hodges ..	Maj., quartermaster...	Assistant to the Quartermaster-General.	Nov. 1, 1875	Jan. 24, 1876
Asa Bird Gardner...	Maj., judge-advocate..	Judge-advocate Howard court of inquiry.	Mar. 3, 1874	May 9, 1874
George H. Weeks..	Capt., A. Q. M.	Awaiting orders and settling his accounts with the Treasury Department.	Sept. 29, 1869	Jan. 18, 1870
James Gillies	do.....	Awaiting orders.....	Mar. 4, 1869	Mar. 26, 1869
Daniel G. Thomas...	Capt., mil. storekeeper	In charge of clothing depot	Mar. 4, 1869	Apr. 1, 1870
Michael P. Small....	Capt., com. of sub.....	Settling his accounts with the Treasury Department.	Aug. 1, 1869	Aug. 31, 1869
William H. Nash	do.....	Assistant to the depot commissary of subsistence.	Mar. 4, 1869	June 24, 1869
Joseph J. Woodward	Capt., asst. surg	Assistant to the Surgeon-General.	Mar. 4, 1869	Jan. 24, 1876
John S. Billings....	do.....	do.....	Mar. 4, 1869	Jan. 24, 1876
John Brooke.....	do.....	In charge of post-hospital, and examining surgeon.	Mar. 4, 1869	Apr. 10, 1869
Edward Curtis.....	do.....	Assistant to the Surgeon-General.	Mar. 4, 1869	Feb. 9, 1870
George A. Otis.....	do.....	do.....	Mar. 4, 1869	Jan. 24, 1876
Henry Johnson.....	Capt., med. storekeeper	In charge of medical stores.	Mar. 4, 1869	Aug. 3, 1870
William R. King...	Capt., Corps of Engineers.	Assistant to the Chief of Engineers.	Mar. 4, 1869	June 1, 1870
George McGown....	Capt., retired	Special duty in the Adjutant-General's Office.	Mar. 4, 1869	Feb. 21, 1870
Adam Badeau	1st Lieut., 4th Inf.....	With the President	Mar. 4, 1869	May 12, 1869
Do.....	Capt., retired	Temporary duty in Washington.	Dec. 6, 1869	Feb. 21, 1870

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of act of August 10, 1868, and act of July 13, 1870, sections 1081 and 1082, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$597 66	\$13,214 02	\$18,811 68	\$3,231 00	\$1,425 60	\$537 95	\$1,625 73	\$3,639 28
	2,523 60	2,523 60	3,507 70	540 00	200 33	211 51	951 84
	13,008 32	13,008 32	3,000 00	3,748 80	1,062 56	1,601 89	6,413 25
103 56	3,238 71	3,362 27	2,769 83	1,118 40	370 11	451 81	1,940 32
	1,380 56	1,380 56	3,500 00	360 00	66 64	111 29	537 93
	350 00	350 00	3,500 00				
	9,897 95	9,897 95	2,882 90	2,904 00	704 94	1,138 84	4,747 78
	366 66	366 66	3,000 00	96 00			96 00
	4,440 25	4,440 25	3,898 75	1,008 00	169 11	325 43	1,502 54
	5,082 58	5,082 58	3,250 00	1,353 80	379 70	440 00	2,173 50
	4,933 33	4,933 33	3,000 00	583 20		464 00	1,067 20
	2,191 66	2,191 66	3,000 00	633 60	1,209 76	234 19	2,077 55
	806 94	806 94	3,500 00	345 60	47 33	56 19	449 12
	504 17	504 17	2,750 00	432 00	80 40		512 40
555 86		555 86	1,832 66	32 40	75 63	22 90	130 93
109 89		109 89	1,798 63				
1,859 34		1,859 34	1,798 63	698 60	272 72	419 23	1,390 55
153 89		153 89	1,832 66		4 44		4 44
533 77		533 77	1,728 63	210 60	68 74	63 49	342 83
2,291 07	13,129 06	15,420 13	2,238 40	4,555 80	1,325 96	2,374 42	8,255 48
2,291 07	12,989 92	15,980 99	2,218 20	4,555 80	1,521 01	1,668 66	7,945 47
173 71		173 71	1,728 63	10 80	5 37	51 56	67 73
1,603 39		1,603 39	1,723 04	604 90	541 88	1,137 26	2,283 94
2,291 07	13,091 61	15,382 68	2,239 96	4,465 80	1,352 19	2,354 99	8,172 98
2,291 07	190 55	2,481 62	1,755 17	858 60	326 27	318 95	1,501 82
2,147 73		2,147 73	1,728 63	804 60	306 68	266 15	1,377 43
1,578 64		1,578 64	1,614 63	626 40	234 74		861 14
667 04		667 04	1,611 64	89 30 91 80	124 37	58 62	364 09
28,328 60	230,781 03	259,109 63	113,072 64	70,335 49	20,225 81	30,305 03	120,866 33

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Henry W. Janes...	Capt. and A. Q. M.	Settling his accounts with the Treasury Department.	Mar. 4, 1870	Aug. 8, 1870
Gilbert C. Smith...	do	do.	May 11, 1870	Sept. 12, 1870
Lewis C. Forsyth...	do	do.	June 23, 1870	June 14, 1871
Charles H. Hoyt...	do	In charge of clothing depot.	Apr. 1, 1870	May 30, 1870
Charles McClure...	Capt. and C. S.	Assistant to the Commissary-General of Subsistence.	May 30, 1870	Oct. 30, 1873
Charles B. Phillips.	Capt., Corps of Engineers.	Assistant engineer of the defenses at Washington.	Dec. 18, 1870	May 6, 1872
Charles W. Thomas	Capt. and A. Q. M.	Settling his accounts with the Treasury Department.	Jan. 15, 1871	May 31, 1872
John R. McGinnies.	Capt., Ordnance Department.	Assistant to the Chief of Ordnance.	Jan. 20, 1871	Mar. —, 1871
James G. C. Lee...	Capt. and A. Q. M.	Settling his accounts with the Treasury Department.	Nov. 15, 1872	Apr. 5, 1873
Thomas Wilson...	Capt. and C. S.	Assistant to the Commissary-General of Subsistence.	Oct. 22, 1872	Nov. 30, 1872
Harvey E. Brown...	Capt. and assistant surgeon.	Preparing report on quarantine system.	Nov. 1, 1872	Sept. 1, 1873
William J. Twining	Capt., Corps of Engineers.	With Northern Boundary Commission preparing for the field.	June 11, 1872	July —, 1872
Do.....	do	With Northern Boundary Commission preparing report of work.	Nov. 13, 1872	Jan. 24, 1876
Stephen C. Lyford.	Capt., Ordnance Department.	Assistant to the Chief of Ordnance.	July 1, 1872	June 22, 1874
Do.....	Maj. Ordnance Department.	do.	June 23, 1874	Jan. 24, 1876
Edward D. Baker.	Capt. and A. Q. M.	Settling his accounts with the Treasury Department.	Dec. 23, 1873	Feb. 12, 1874
A. J. McGonnigle.	do	In charge of national cemeteries.	June 25, 1873	Aug. 19, 1871
J. W. Barriger...	Capt. and C. S.	Assistant to the Commissary-General of Subsistence.	Nov. 12, 1873	Nov. 20, 1875
Do.....	Maj. and C. S.	do.	Nov. 21, 1873	Jan. 24, 1876
Elliot Coues.....	Capt. and assistant surgeon.	With Northern Boundary Commission, preparing report of work.	Oct. 23, 1873	May —, 1874
A. F. Rockwell...	Capt. and A. Q. M.	In charge of national cemeteries.	Oct. —, 1874	Jan. 24, 1876
George W. McKee.	Capt., Ordnance Department.	Assistant to the Chief of Ordnance.	July 27, 1874	Dec. 1, 1874
William T. Howell.	Capt. and A. Q. M.	Settling his accounts with the Treasury Department.	Aug. 24, 1875	Oct. 22, 1875
John V. Furey.....	do	Assistant to the depot quartermaster.	Aug. 2, 1875	Jan. 24, 1876
Charles B. Penrose.	Capt. and C. S.	Assistant to the Commissary-General of Subsistence.	July 17, 1875	Nov. 22, 1875
F. F. Whitehead...	do	do.	May 5, 1875	July 6, 1875

PAY AND ALLOWANCES OF CERTAIN OFFICERS.

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in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of law cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 94, act of July 15, 1870, sections 1361 and 1362, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$562 45	\$221 11	\$783 56	\$1, 956 73	\$277 55	\$44 33	\$33 73	\$355 61
250 61	428 88	679 49	1, 956 73	219 60	5 69		225 29
38 12	2, 078 85	2, 117 07	2, 078 37	628 30	217 07	398 09	1, 243 36
280 19		280 19	1, 956 74	95 40	32 65		128 05
149 83	7, 553 83	7, 703 66	2, 273 21	2, 304 00	552 84	1, 286 21	4, 143 05
	3, 043 32	3, 043 32	2, 200 00				
	3, 578 28	3, 578 28	2, 600 00	272 00	94 66	64 18	430 84
	250 55	250 55	2, 200 00	108 00			108 00
	907 23	907 23	2, 232 80	309 40	19 06	99 94	428 42
	238 33	238 33	2, 200 00	88 20	20 94	32 67	141 81
	2, 000 00	2, 000 00	2, 400 00	633 80	166 74	337 67	1, 138 01
	121 22						
	2, 873 33	2, 995 54	2, 396 40	75 60		301 09	376 69
	5, 925 00		3, 000 00		56 44	703 28	3, 931 32
	4, 766 67	10, 691 67		3, 171 80			
	326 67	326 67	2, 400 00	108 00	37 98	48 49	194 47
	2, 599 96	2, 599 96	2, 300 00	756 00	174 71	379 43	1, 310 14
	5, 265 00						
	568 74	5, 833 23	2, 925 00	1, 224 00	346 02	468 66	2, 038 68
	1, 253 33						
	2, 953 33	4, 206 66	2, 400 00	241 80		171 71	413 51
	1, 286 66	1, 286 66	2, 400 00	997 20	292 37	451 69	1, 741 16
	1, 021 33	1, 021 33	3, 000 00	304 80	56 17	95 21	456 18
	426 67	426 67	2, 400 00	120 60	41 16	57 42	219 18
	1, 146 66	1, 146 66	2, 400 00	311 40	104 88	162 74	579 02
	833 33	833 33	2, 400 00	226 20	63 77	99 37	449 34
	406 67	406 67	2, 400 00	93 60	61 52	36 40	191 52

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Ely McClellan	Capt. and assistant surgeon.	Preparing report on epidemic cholera.	Jan. 4, 1875	June 19, 1875
David P. Heap	Capt. Corps of Engineers.	Collecting articles for the international exhibition.	Oct. 15, 1875	Jan. 10, 1876
Thomas J. Haines ..	Maj. and C. S.	Assistant to the Commissary-General of Subsistence.	June 1, 1875	Jan. 24, 1876
James R. Roach ...	Maj. and paymaster...	In the War Department finishing business as disbursing-clerk.	Apr. 1, 1875	June 28, 1875
T. T. Thornburgh ..	do	Under instructions of the Paymaster-General.	Apr. 27, 1875	June 3, 1875
W. M. Maynadier ..	do	do	May 3, 1875	June 5, 1875
William S. Smoot ..	1st lieut., Ordnance Department.	Assistant to the Chief of Ordnance.	Mar. 4, 1869	Oct. 18, 1870
John H. McBlair ..	1st lieut., retired.....	Assistant to the Commissioner Bureau of Refugees, Freedmen, and Abandoned Lands.	Mar. 4, 1869	Feb. 21, 1870
Wm. H. H. Michler ..	1st lieut. and assistant surgeon.	Before examining board....	Dec. 5, 1870	Jan. 27, 1871
George M. Wheeler ..	1st lieut. Corps of Engineers.	In charge of explorations and surveys west 100th meridian, preparing for the field.	Feb. 22, 1871 Dec. —, 1871	Apr. —, 1871 July 3, 1872
Do	do	Preparing report of work.	Dec. 22, 1872 Oct. 11, 1873 Oct. 16, 1874 Sept. 10, 1875	May 26, 1873 July 8, 1874 May 27, 1875 Jan. 24, 1876
James F. Gregory ..	1st lieut. Corps of Engineers.	With Northern Boundary Commission, preparing for the field.	June 7, 1872	July —, 1872
Do	Capt. Corps of Engineers.	Preparing report of work ..	Nov. 13, 1874	Jan. 24, 1876
James H. Weeden ..	1st lieut. Corps of Engineers.	Special duty in the office of the Chief of Engineers.	May 13, 1872	Jan. 7, 1872
Do	do	With Northern Boundary Commission, preparing for the field.	June 7, 1872	July 22, 1872
Dan'l W. Lockwood ..	do	Assistant to Lieutenant Wheeler in office Explorations and Surveys West 100th Meridian, preparing report of work.	Jan. 24, 1872	July 3, 1872
Richard L. Hoxie ..	do	do	Dec. 27, 1872	May 11, 1873
Do	do	do	Dec. 22, 1873	July 1, 1874
Do	do	Engineer of the District of Columbia.	July 2, 1874	Jan. 24, 1876
Wm. L. Marshall ..	do	Assistant to Lieutenant Wheeler in office explorations and surveys west 100th meridian, preparing report of work.	Dec. 25, 1872	May 22, 1873
Do	do	do	Dec. 27, 1873	July 6, 1874
Do	do	do	Dec. 13, 1874	May 11, 1875
Do	do	do	Dec. 11, 1875	Jan. 24, 1876

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 94 act of July 15, 1870, sections 1281 and 1283 Revised Statutes of the United States.	Total.	Average annual rate of pay &c. or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1058 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
	\$1,100 00	\$1,100 00	\$2,400 00				
	566 67	566 67	2,400 00	\$154 80	\$59 79	\$83 42	\$298 01
	1,973 63	1,973 63	3,500 00		132 39	210 00	342 39
	604 16	604 16	2,500 00	216 00	35 56	29 22	280 78
	275 01	275 01	2,750 00	50 40	3 32	22 60	76 32
	275 01	275 01	2,750 00	57 60	425 32		482 92
\$2,039 22	510 17	2,549 39	1,649 30	699 60	234 34	665 39	1,599 33
1,450 17		1,450 17	1,500 63	419 40	161 37		580 77
	259 99	259 99	1,800 00				
	266 66						
	889 80						
	752 91	4,945 44	1,760 00	1,342 00	407 15	1,276 87	3,026 02
	1,305 36						
	1,080 47						
	650 24						
	2,868 40	2,868 40	2,120 00	54 00	1 71	410 10	465 81
	337 34	337 34	1,760 00	128 40	6 20	95 86	230 46
	777 35	777 35	1,760 00	189 60	49 37	158 63	397 60
	595 54						
	977 80	4,320 96	1,720 00	282 80	351 30	276 46	2,120 56
	2,747 62						
	633 31						
	2,471 11	1,720 00	505 20	89 77	167 67		762 64
	924 02						
	723 57						
	170 21						
4,770 69	73,361 27	78,131 96	86,665 91	17,336 55	4,346 51	9,734 20	31,417 26

List of officers of the United States Army on duty or stations

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Thomas Turtle ...	1st lieut., Corps of Engineers.	Assistant engineer of the defenses of Washington.	Apr. 1, 1873	Nov. 13, 1873
Samuel E. Tillman	do	Assistant to Lieut. Wheeler in office Explorations and Surveys West 100th Meridian, preparing report of work.	Dec. 27, 1873	Mar. 16, 1874
Philip M. Price ...	do	do	Dec. 7, 1874	May 8, 1875
Stanhope E. Blunt	1st lieut., Ordnance Department.	do	Nov. 23, 1874	Dec. 30, 1874
Chas. W. Whipple	2d lieut., 3d Art.	do	Dec. 8, 1874	May 25, 1875
Do	1st lieut., Ordnance Department.			
Francis V. Greene	2d lieut., Corps of Engineers.	With Northern Boundary Commission preparing for the field.	June 11, 1872	July —, 1872
Do	1st lieut., Corps of Engineers.	With same, preparing report of work.	Nov. 13, 1874	Jan. 24, 1876
Carl F. Palfrey	2d lieut., Corps of Engineers.	With Northern Boundary Commission preparing for the field.	June 11, 1872	July 22, 1872
James C. McCoy	Col. and A. D. C.	A. D. C. to the General of the Army.	Mar. 8, 1869	Nov. —, 1874
John T. Sprague	Col., unassigned	Settling his accounts with the Treasury Department.	Oct. —, 1869	July 31, 1870
Wm. S. Ketchum	Col., 11th Inf.	On duty in War Department.	Mar. 4, 1869	Dec. 15, 1870
Fred. T. Dent	Col. and A. D. C.	With the President.	Mar. 4, 1869	May 13, 1873
Wager Swayne	Col., unassigned	On duty in War Department.	May 15, 1869	Apr. 30, 1870
Jos. C. Audenried	Col. and A. D. C.	A. D. C. to the General of the Army.	Mar. 8, 1869	Oct. 15, 1874
Lewis M. Dayton	do	do	Mar. 8, 1869	Dec. 31, 1870
Horace Brooks	Col., 4th Art.	Commanding Department of Washington.	Mar. 4, 1869	Mar. 13, 1869
R. S. Mackenzie	Col., 24th Inf.	Member of examining-board.	Oct. 17, 1870	Jan. 3, 1874
John C. Tourtellotte	Col. and A. D. C.	A. D. C. to the General of the Army.	Jan. 1, 1871	Oct. 15, 1874
Thomas N. Ruger	Col., 18th Inf.	Member of examining-board.	Oct. 17, 1870	Jan. 3, 1871
Henry J. Hunt	Col., 5th Art.	Member of Army Regulation board.	Jan. 3, 1872	May 2, 1872
I. N. Palmer	Col., 2d Cav.	Witness for the Government under orders of the Attorney-General.	Mar. 31, 1873	June 1, 1873
Jos. J. Reynolds	Col., 3d Cav.	Member of the Howard court of inquiry.	Mar. 3, 1874	May 9, 1874
George W. Getty	Col., 3d Art.	do	Mar. 10, 1874	May 9, 1874
Wm. H. Emory	Col., 5th Cav.	President of retiring-board.	Oct. 11, 1875	Jan. 24, 1876
Charles H. Smith	Col., 19th Inf.	Member of examining-board.	Oct. 17, 1870	Jan. 3, 1871
John E. Smith	Col., unassigned	On duty in War Department.	May 12, 1869	Jan. 2, 1871
Do	Col., 14th Inf.	Relating to Indian affairs.	Dec. 1, 1871	Jan. 3, 1872
Nelson A. Miles	Col., 5th Inf.	Member of the Howard court of inquiry.	Mar. 10, 1874	May 9, 1874
John M. Bacon	Col. and A. D. C.	A. D. C. to the General of the Army.	Jan. 1, 1871	May 1, 1871
Do	do	do	May 1, 1872	Oct. 15, 1874
Wm. H. French	Lieut. col., 2d Art.	Member of general court-martial.	Mar. 4, 1869	June 31, 1869
Wm. P. Carlin	Lieut. col., 76th Inf.	Member of retiring-board.	Oct. 11, 1873	Jan. 24, 1876
Wm. H. Lewis	Lieut. col., 19th Inf.	do	Oct. 11, 1873	Jan. 24, 1876

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1860, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 94, act of July 15, 1870, sections 1281 and 1282, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
.....	\$1,085 36	\$1,085 36	\$1,760 00	\$298 80	\$35 89	\$222 28	\$556 97
.....	306 66	306 66	1,600 00	180 06	2 85	.....	182 85
.....	751 08	751 08	1,600 00	184 80	103 92	125 77	414 49
.....	138 33	138 33	1,500 00	39 60	21 50	27 67	88 77
.....	714 37	851 96	1,650 00	243 60	121 28	47 08	411 96
.....	136 89						
.....	247 50	567 50	1,550 00	58 80	4 83	481 53	545 16
.....	320 00						
.....	170 83	170 83	1,500 00	48 00	3 87	32 26	84 13
\$3,618 54	17,053 48	20,672 02	3,660 55	3,330 00	1,323 13	1,906 64	6,559 77
2,176 91	360 42	2,537 33	3,383 10	540 00	174 22	193 66	907 88
4,442 73	2,035 42	6,478 15	3,632 15	1,891 00	540 03	678 23	3,109 30
4,197 71	12,716 65	16,914 36	4,035 24	6,455 00	1,110 43	1,464 50	9,029 93
2,644 09	.....	2,644 09	2,733 23	1,215 00	319 91	281 71	1,816 62
3,618 55	17,763 21	21,381 76	3,814 43	5,277 00	1,076 41	1,612 60	7,966 01
3,618 55	1,055 14	4,673 69	3,047 27	1,416 00	423 97	394 31	2,234 28
96 72	.....	96 72	3,897 54	.....	.....	.....	.....
.....	919 71	919 71	3,850 00	180 00	61 51	.....	241 51
.....	15,123 80	15,123 80	3,928 62	4,035 00	627 31	1,253 99	5,976 30
.....	1,213 33	1,213 33	4,200 00	.....	.....	.....	.....
.....	1,487 50	1,487 50	4,500 00	360 00	.....	.....	360 00
.....	750 00	750 00	4,500 00	.....	.....	96 22	96 22
.....	825 00	825 00	4,500 00	.....	.....	.....	.....
.....	369 50	369 50	4,500 00	.....	.....	.....	.....
.....	1,287 50	1,287 50	4,500 00	822 00	293 89	111 59	1,227 48
.....	819 76	819 76	3,650 00	279 00	99 74	.....	378 74
3,128 90	1,923 80	5,426 03	3,300 84	1,764 00	440 76	587 23	2,791 99
.....	373 33						
.....	682 33	682 33	4,200 00	.....	.....	.....	.....
.....	1,283 32	10,928 66	3,914 74	2,532 00	605 94	1,010 55	4,154 49
.....	9,645 34						
893 08	.....	893 08	2,998 31	259 20	90 77	131 42	481 5
.....	1,144 43	1,144 43	4,000 00	275 20	105 80	83 41	424 41
.....	1,144 43	1,144 43	4,000 00	219 80	85 24	102 47	437 31

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
George Gibson....	Maj., 1st Inf., and unassigned.	Recorder of board of claims	Mar. 4, 1869	Apr. 26, 1869
Henry R. Rathbone	Maj., 5th Inf., and unassigned.	On duty in the Adjutant-General's Office in connection with disbursing freedmen's claims.	Mar. 4, 1869	Jan. 1, 1871
Oscar A. Mack....	Maj., unassigned, and 1st Inf.	On duty in the War Department as inspector of national cemeteries.	Jan. 7, 1869	Dec. 14, 1874
Do.....	Lieut. col., 21st Inf.	 do	Dec. 15, 1874	Jan. 24, 1876
Levi C. Bootes....	Maj., 26th Inf., and unassigned.	Member of general court-martial.	Mar. 4, 1869	Mar. 30, 1869
E. G. Beckwith....	Maj., 2d Art.	Assistant to the Commissary General of Subsistence.	Mar. 4, 1869	Jan. 24, 1876
A. J. Alexander..	Maj., 8th Cav.	Recorder of Army Regulation board.	Jan. 3, 1872	May 2, 1872
Henry C. Bankhead	Maj., 4th Cav.	Member of examining-board for appointment of 2d lieutenants, U. S. A.	Nov. 27, 1874	Dec. 8, 1874
Nelson B. Switzer.	Maj., 2d Cav.	Member of Army ambulance board.	Oct. —, 1875	Jan. 24, 1876
George A. Gordon..	Maj., 5th Cav.	Member of examining-board for appointment of 2d lieutenants, U. S. A.	July 13, 1875	Sept. 17, 1875
Do.....	do	do	Sept. 23, 1875	Oct. 19, 1875
Verling K. Hart....	do	Member of Centennial board executive department.	Dec. 17, 1875	Jan. 24, 1876
Richard I. Dodge..	Maj., 3d Inf.	Member of Army Regulation board.	Jan. 3, 1872	May 2, 1872
Thos. M. Anderson	Maj., 10th Inf.	Relating to Mexican cattle claims.	Jan. —, 1873	Feb. 28, 1873
Alex. Chambers....	Maj., 4th Inf.	Settling his accounts with the Treasury Department.	Jan. —, 1875	Mar. 31, 1875
Do.....	do	Member of Army ambulance board.	Apr. 1, 1875	May 31, 1875
Edwin R. Ames....	Capt., 7th Inf.	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Apr. 3, 1869
Henry Clayton....	Capt., unassigned, and 17th Inf.	On duty in War Department	June 1, 1869	Oct. 1, 1870
Jacob H. Smith....	Capt., 13th Inf.	Assistant to Judge-Advocate-General.	Mar. 4, 1869	May 31, 1869
William M. Wherry	Capt., 31st Inf.	A. D. C. to Gen. Schofield.	Mar. 4, 1869	Mar. 15, 1869
Charles M. Pyne...	Capt., unassigned	On recruiting-service.	June 16, 1869	Mar. 5, 1870
Do.....	do	Assistant to the Chief Signal-Officer.	Apr. 19, 1870	Dec. 15, 1870
Theo. A. Dodge....	Capt., 44th Inf. and unassigned.	Superintendent of War Department buildings.	Mar. 4, 1869	Feb. 1, 1870
Edward Ball.....	Capt., 2d Cav.	Settling his accounts with the Treasury Department.	Mar. 13, 1869	May 7, 1869
James McMillan...	Capt., 11th Inf.	Recorder of examining-board	Oct. 17, 1870	Jan. 11, 1871
Do.....	Capt., 3d Art.	On duty in Adjutant-General's Office as chief disbursing-officer of freedmen's funds.	Jan. 12, 1871	Jan. 24, 1876
William H. Prown	Capt., 5th Cav.	Settling his accounts with the Treasury Department.	Feb. —, 1872	Apr. 2, 1872
Garrick Mallory...	Capt., unassigned, and 1st Inf.	Assistant to the Chief Signal-Officer.	Oct. 25, 1870	Jan. 24, 1876

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 34, act of July 13, 1870, sections 1331 and 1332, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$349 01	.....	\$349 01	\$2, 411 23	\$136 80	\$78 03	\$63 52	\$278 35
2 753 48	\$1, 367 72	4, 121 20	2, 258 16	1, 416 60	501 09	697 46	2, 616 05
2 471 13	15, 594 62 4, 433 33	22, 499 08	3, 392 05	5, 900 60	1, 562 55	2, 405 50	9, 768 85
180 63	.....	180 63	2, 515 30	58 60	36 71	29 94	125 25
3, 471 73	19, 463 41	22, 935 14	3, 329 29	6, 006 40	1, 685 70	1, 936 44	9, 628 54
.....	991 67	991 67	3, 000 00	288 00	66 31	134 28	488 59
.....	106 94	106 94	3, 500 00	38 40	9 62	.....	48 02
.....	806 95	806 95	3, 500 00	220 80	42 56	111 48	374 84
37, 661 76	126, 605 06	174, 266 62	124, 093 11	45, 986 00	11, 656 67	16, 223 84	73, 866 51
.....	722 21	722 21	3, 250 00	259 90	55 00	90 27	404 47
.....	308 33	308 33	3, 000 00	91 20	28 50	41 62	171 32
.....	1, 156 95	1, 156 95	3, 500 00	288 00	135 26	.....	423 26
.....	500 00	500 00	3, 000 00	.....	.....	.....	.....
.....	1, 458 35	1, 458 35	3, 500 00	216 00	6 27	.....	222 27
140 00	.....	140 00	1, 671 63	26 13	18 20	.....	44 33
1, 748 47	400 92	2, 239 39	1, 795 28	918 00	243 50	.....	1, 161 50
391 55	.....	391 55	1, 614 63	156 60	70 22	.....	226 82
60 91	.....	60 91	2, 002 23	29 61	20 62	29 96	80 19
1, 160 61	.....	1, 160 61	1, 614 63	427 60	27 25	52 64	507 49
1, 470 83	.....	1, 470 83	1, 614 63	747 00	207 95	184 27	1, 139 22
259 72	.....	259 72	1, 728 63	.....	.....	.....	.....
.....	12, 203 50	12, 203 50	2, 315 89	3, 489 40	685 80	.....	4, 175 20
.....	406 66	406 66	2, 400 00	.....	.....	.....	.....
.....	12, 471 63	12, 471 63	2, 376 80	3, 456 00	989 79	2, 125 55	6, 641 34

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
John N. Craig.....	Capt., unassigned	On duty with Indian Bureau	Jan. —, 1870	May —, 1870
Do.....	Capt., 10th Inf	Settling accounts with Indian Bureau, &c.	Feb. —, 1871	Sept. 9, 1872
Do.....	do	On duty in the Department of Justice.	Sept. 9, 1872	Mar. 17, 1873
Charles J. Dickey.....	Capt., 22d Inf	On duty in War Department	Feb. 3, 1872	June 22, 1872
Do.....	do	do	Nov. 29, 1872	Mar. 15, 1873
Luke O'Reilly.....	Capt., 19th Inf	do	June 1, 1873	Sept. 15, 1873
Jos. S. Conrad.....	Capt., 2d Inf	Disbursing officer Centennial board, executive department.	Mar. 22, 1875	Jan. 24, 1876
Arthur MacArthur, jr.	Capt., 13th Inf	Member of examining board for appointment of 2d lieutenants U. S. A.	Aug. 1, 1875	Sept. 17, 1875
Do.....	do	Recorder of retiring board.	Oct. 8, 1875	Jan. 24, 1876
Edwin T. Bridges.....	1st lieut., 5th Inf., and unassigned.	Assistant to the Dept. Commissary of Subsistence.	Mar. 4, 1869	Dec. 31, 1870
Thomas H. Bradley.....	1st lieut., 21st Inf.	On duty in War Department	Mar. 4, 1869	Jan. 24, 1876
John E. Hoemer.....	1st lieut., unassigned ..	Assistant to the Chief Signal-Officer.	Oct. 8, 1869	Dec. —, 1869
Jos. A. Sladen.....	1st lieut., 14th Inf.	A. D. C. to Gen. Howard ..	Mar. 4, 1869	Aug. 6, 1874
Lemuel B. Norton.....	1st lieut., 1st Art	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Sept. 25, 1871
John P. Story, jr.	1st lieut., 34th Inf.	do	Mar. 4, 1869	July —, 1869
Denis J. Downing.....	1st lieut., 44th Inf., and unassigned.	Assistant to the sup't War Department buildings.	Mar. 4, 1869	Dec. 15, 1870
Richard W. Tyler.....	1st lieut., unassigned ..	do	July 21, 1869	Dec. 15, 1870
Henry Marcotte.....	1st lieut., 44th Inf.	do	Mar. 4, 1869	Apr. 14, 1869
Henry Jackson.....	1st lieut., 7th Cav	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Mar. 25, 1869
Do.....	do	do	Aug. 30, 1871	Jan. 24, 1876
William Ennis.....	1st lieut., 4th Art	A. D. C. to Gen. Schofield ..	Mar. 4, 1869	Mar. 15, 1869
Jared L. Rathbone.....	1st lieut., 1st Art	On duty in War Department	Mar. 4, 1869	Mar. 23, 1869
Robert Craig.....	1st lieut., 4th Art	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Mar. 31, 1869
Do.....	do	do	June 1, 1871	Jan. 24, 1876
Thomas R. Adams.....	1st lieut., 5th Art	do	Aug. 23, 1871	Jan. 24, 1872
Adolphus W. Greely.....	1st lieut., 5th Cav	do	July 29, 1871	Apr. 6, 1873
Ramsey D. Potts.....	1st lieut., 3d Art	Recruiting service	July 31, 1872	Jan. 1, 1873
Charles S. Smith.....	1st lieut., 4th Art	Assistant to the Chief Signal-Officer.	Jan. 24, 1874	June 22, 1873
Henry H. C. Dunwoody.	do	do	Aug. 22, 1872	Jan. 24, 1876
Frank C. Gragan.....	1st lieut., 2d Cav	do	June 24, 1874	June 24, 1876
Charles C. Morrison.....	1st lieut., 6th Cav	Assistant in Office Explorations and Surveys West of 100th Meridian, preparing report of work.	Dec. 12, 1875	Jan. 24, 1876
Edward D. Wheeler.....	1st lieut., 1st Art	On duty in the Office of the Inspector-General.	Oct. 15, 1875	Jan. 24, 1876
C. C. Wolcott.....	1st lieut., 3d Art	Under orders of Secretary of the Navy developing invention of motive power.	May 5, 1875	Jan. 24, 1876
William Stone.....	1st lieut., unassigned ..	Assistant to the Superintendent War Department Buildings.	Feb. 25, 1870	Oct. 12, 1870

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of law cited in table of "Pay of the Army," amended to Army Regulations for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 94, act of July 15, 1870, sections 1261 and 1262, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$670 91	\$4,213 00	\$4,883 91	\$1,919 44	\$756 00	\$230 46	\$31 26	\$1,018 72
.....	1,470 00	1,470 00	2,160 00	513 00	145 61	.....	658 61
.....	577 50	577 50	1,980 00	.....	.....	.....	.....
.....	1,983 00	1,983 00	2,340 00	545 40	207 00	.....	752 40
.....	912 00	912 00	2,160 00	313 20	118 40	.....	431 60
1,988 97	893 29	2,882 26	1,540 42	787 40	277 66	.....	1,065 06
1,988 97	9,571 45	11,560 42	1,678 12	2,994 20	726 79	.....	3,720 99
331 96	.....	331 96	1,439 82	99 80	49 13	100 19	349 12
2,117 07	7,892 07	9,939 14	1,832 46	2,371 40	680 80	1,851 03	4,903 20
2,039 22	2,195 88	4,235 06	1,655 40	1,219 40	390 94	664 02	2,274 36
676 15	.....	676 15	1,655 87	175 40	51 61	148 73	375 74
1,988 98	891 04	2,880 02	1,614 96	769 40	270 06	161 01	1,200 50
1,417 75	753 54	2,171 29	1,547 84	606 00	157 89	49 20	813 09
167 48	.....	167 48	1,507 32	48 00	34 31	.....	82 31
83 27	7,750 97	7,834 24	1,757 21	1,817 77	518 47	733 66	3,069 90
51 98	.....	51 98	1,708 16	19 74	.....	.....	19 74
89 78	.....	89 78	1,708 16	31 40	19 08	37 63	88 11
108 49	8,171 72	8,280 21	1,753 44	2,094 20	615 82	1,947 76	4,657 78
.....	669 59	669 59	1,595 37	129 60	43 19	126 24	359 03
.....	6,587 08	6,587 08	1,786 99	1,724 40	323 53	1,243 13	3,351 06
.....	692 08	692 08	1,650 00	450 00	38 34	.....	498 34
.....	2,512 25	2,512 25	1,760 00	388 00	130 33	420 84	999 17
.....	6,023 25	6,023 25	1,760 00	1,533 60	490 82	1,150 03	3,104 51
.....	3,040 00	3,040 00	1,920 00	625 20	184 00	299 83	1,169 03
.....	186 66	186 66	1,600 00	51 60	21 60	46 23	119 52
18,953 07	96,544 60	115,497 67	79,415 33	30,348 85	8,154 35	11,666 10	50,169 30
.....	495 00	495 00	1,800 00	120 00	33 81	.....	159 81
.....	1,295 00	1,295 00	1,800 00	313 20	81 05	21 00	418 28
524 96	435 37	960 33	1,554 70	365 14	50 23	.....	415 37

List of officers of the United States Army on duty or stationed

Name.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Rogers Birnie, jr.	1st lieut., 13th Inf.	Assistant in Office of Explorations and Surveys West of the 100th Meridian, preparing report of work.	Dec. 7, 1874	May 12, 1875
Do.	do	do	Dec. 1, 1875	Jan. 24, 1876
Thomas H. Fisher.	1st lieut., 22d Inf.	On duty in War Department	Nov. 12, 1874	Jan. 24, 1876
Wm. L. Carpenter.	1st lieut., 9th Inf.	Assistant in Office of Explorations and Surveys West of the 100th Meridian, preparing report of work.	Dec. 13, 1875	Jan. 24, 1876
Erskine M. Camp.	1st lieut., 12th Inf.	Settling his accounts with the Treasury Department.	Jan. 1, 1875	Aug. 23, 1875
David I. Craigie	do	do	Oct. 27, 1875	Jan. 24, 1876
M. C. Wilkinson	2d lieut., unassigned ..	Instructor military tactics Howard University.	Sept. 14, 1869	Aug. 3, 1870
Do.	1st lieut., 3d Inf.	A. D. C. to General Howard	Mar. —, 1871	Aug. 6, 1874
Henry W. Howgate	2d lieut., 20th Inf.	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Aug. 3, 1875
Do.	1st lieut., 20th Inf.	do	Aug. 4, 1875	Jan. 24, 1876
David G. Swain	2d lieut., 34th Inf. and unassigned.	A. D. C. to General Howard	Mar. 4, 1869	Jan. 29, 1870
Charles W. Keyes.	2d lieut., 44th Inf. and unassigned.	Assistant to the Superintendent War Department Buildings.	Mar. 4, 1869	Aug. 1, 1869
Benjamin M. Platt	do	do	Mar. 4, 1869	Feb. 3, 1870
Do.	do	A. D. C. to General Howard.	Feb. 3, 1870	Dec. 31, 1870
R. G. Rutherford.	2d lieut., 45th Inf.	Member of general court-martial.	Mar. 4, 1869	Mar. 30, 1869
Albert W. Preston	2d lieut., 8th Cav.	Assistant to the Chief Signal-Officer.	Mar. 4, 1869	Mar. 25, 1869
Frederick D. Grant	2d lieut., 4th Cav.	On duty at Headquarters of the Army.	Sept. —, 1872	Nov. 20, 1872
Do.	Lieut. col. and A. D. C.	A. D. C. to Lieutenant-General Sheridan.	Dec. 10, 1873	Mar. 29, 1874
Do.	do	do	Dec. —, 1875	Jan. 24, 1876
David I. Gibbon	2d lieut., 9th Cav.	Assistant to the Chief Signal-Officer.	Mar. 22, 1872	Aug. 22, 1872
Do.	do	do	Apr. 7, 1873	Jan. 16, 1875
Thos. C. Davenport	do	do	Dec. 24, 1872	Feb. 14, 1873
David A. Lyle	2d lieut., 1st Art.	Assistant in Office of Explorations and Surveys West of the 100th Meridian, preparing report of work.	Jan. 22, 1872	July 1, 1872
Edgar Z. Steever	2d lieut., 3d Cav.	With Palestine Exposition Society.	Dec. —, 1873	Oct. 1, 1874
Andrew H. Russell.	do	Assistant in Office of Explorations and Surveys West of the 100th Meridian, preparing report of work.	Dec. 27, 1873	Feb. 16, 1874
Henry H. Bellas	2d lieut., 4th Cav.	On duty in War Department	Oct. 15, 1873	Mar. 21, 1874
Charles W. Larned	2d lieut., 7th Cav.	do	Dec. 24, 1873	Aug. 22, 1874
Alex. B. Dyer	2d lieut., 4th Art.	Recruiting service	Oct. 14, 1873	July 2, 1874
Edward Hoppy	2d lieut., unassigned ..	Assistant to the Superintendent War Department Buildings.	Apr. 14, 1869	Aug. 3, 1870

in the city of Washington since March 4, 1869, &c.—Continued.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 41, act of July 13, 1870, sections 1381 and 1382 Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 13, 1870.			
				Quarters.	Fuel.	Forage.	Total.
	\$645 83						
		\$866 66	\$1,500 00	\$273 60	\$113 25		\$386 85
	220 83						
	360 00	360 00	1,800 00	519 60	163 33		682 92
	187 92	187 92	1,650 00	50 40	25 38		75 78
	1,170 00	1,170 00	1,600 00	288 00	34 34		322 34
	522 00	522 00	2,180 00	106 00	42 76	\$23 41	232 17
\$1,149 21	134 03	7,972 38	1,879 56	1,896 00	559 45	1,085 42	3,550 87
	6,689 14						
2,040 08	8,634 79	11,586 54	1,681 92	2,768 17	821 15	2,387 32	5,976 64
	911 67						
1,503 04		1,503 04	1,662 56	389 08	140 18	77 23	606 49
548 39		548 39	1,339 64	175 40	55 78		231 18
2,007 77	896 67	2,904 44	1,568 10	787 40	271 97	205 64	1,265 01
103 64		103 64	1,443 63	29 03			29 03
94 75		94 75	1,538 55	17 30	35 84	62 47	115 61
	204 17						
	801 66	1,287 50	2,625 00				
	191 67						
	625 00	3,288 50	1,500 00	974 90	257 38	850 80	2,082 98
	2,663 50						
	208 33	208 33	1,500 00				
	618 35	618 35	1,400 00	190 80	48 92	47 60	287 32
	1,000 00	1,000 00	1,500 00				
	204 17	204 17	1,500 00	72 00	54 56	24 40	150 96
	650 00	650 00	1,500 00	199 20	37 32	123 77	360 29
	1,016 67	1,016 67	1,500 00	228 00	58 66	151 09	497 77
	1,003 36	1,003 36	1,400 00	308 40	85 09		393 49
1,747 30	134 64	1,881 94	1,491 31	570 00	152 69		722 69
9,719 14	32,029 77	41,748 91	40,894 97	10,701 52	3,189 18	5,133 15	19,023 85

List of officers of the United States Army on duty or stationed

RECAPITU

Number of sheet.	Rank, corps, &c.	Duties.	Length of time stationed or on duty.	
			From—	To—
Sheet No. 1				
Sheet No. 2				
Sheet No. 3				
Sheet No. 4				
Sheet No. 5				
Sheet No. 6				
Sheet No. 7				
Aggregate				

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, D. C., June 6, 1876.

in the city of Washington since March 4, 1869, &c.—Continued.

LATION.

Paid by Pay Department.				Paid by Quartermaster's Department.			
Pay, subsistence, servants' allowances, &c., for time prior to July 1, 1870, under authority of laws cited in table of "Pay of the Army," annexed to Army Register for January, 1869, and January, 1870, copy of table herewith.	Salary and percentage for length of service for time subsequent to June 30, 1870, under authority of section 94 act of July 15, 1870, sections 1361 and 1362, Revised Statutes of the United States.	Total.	Average annual rate of pay, &c., or salary, &c., for stated period of duty in Washington.	Allowances of quarters, fuel, and forage authorized by paragraphs 1068 and 1123, Army Regulations, 1863, and act of Congress approved July 15, 1870.			
				Quarters.	Fuel.	Forage.	Total.
\$127, 471 43	\$451, 947 87	\$579, 419 30	\$197, 982 12	\$127, 921 48	\$31, 369 02	\$53, 042 29	\$211, 632 79
79, 750 95	234, 005 70	313, 756 65	113, 688 57	87, 274 48	23, 732 41	27, 827 02	138, 833 91
26, 328 80	230, 781 03	256, 109 83	113, 072 64	70, 335 49	20, 225 81	30, 305 03	130, 866 33
4, 770 69	73, 361 27	78, 131 96	88, 665 91	17, 336 55	4, 346 51	9, 734 20	31, 417 26
37, 661 76	136, 605 06	174, 266 82	124, 093 11	45, 966 00	11, 656 67	16, 223 84	73, 866 51
18, 953 07	96, 544 60	115, 497 67	79, 415 33	30, 348 85	8, 154 35	11, 666 10	50, 169 30
9, 719 14	32, 029 77	41, 748 91	40, 894 97	10, 701 52	3, 189 18	5, 133 15	19, 023 85
306, 655 64	1, 255, 275 30	1, 561, 930 94	755, 812 65	389, 904 37	102, 673 95	153, 931 63	645, 809 95

E. D. TOWNSEND, Adjutant-General.

PAY OF

Table of pay, subsistence, servants' allowances, &c., allowed by law to the officers of the Army, of August

RANK OR GRADE.	SERVICE.	OFFICER FOR SELF.			FOR SERVANTS.			
		PAY.	SUBSISTENCE.		Number of servants allowed.	PAY.	CLOTH-ING.	SUBSIST-ENCE.
		Proper.	Number of rations per day.	Commutation, 30 cents per ration, month of 30 days.		Commutation at \$16.00.	Commutation at \$6.50.	Commutation, 30 cents per ration, month of 30 days.
General	Commanding the Army	\$400 00	80	\$720 00	4	\$64 00	\$26 00	\$18 00
Lieutenant-General	On duty	270 00	80	720 00	4	64 00	26 00	36 00
Major-General	Commanding division or department.	220 00	30	270 00	4	64 00	26 00	36 00
Major-General	Commanding division or department.	220 00	15	135 00	4	64 00	26 00	36 00
Brigadier-General		124 00	24	216 00	3	48 00	19 50	27 00
Brigadier-General	General staff and regimental	124 00	12	108 00	3	48 00	19 50	27 00
Colonel		110 00	6	54 00	2	32 00	13 00	18 00
Lieutenant-Colonel	General staff and regimental	85 00	5	45 00	2	32 00	13 00	18 00
Major	General staff and regimental	80 00	4	36 00	2	32 00	13 00	18 00
Major	Surgeon of 10 years' service.	80 00	8	72 00	2	32 00	13 00	18 00
Captain	Assistant surgeon of 10 years' service.	70 00	8	72 00	1	16 00	6 50	9 00
Captain	Mounted.....	70 00	4	36 00	1	16 00	6 50	9 00
Captain	Not mounted.....	60 00	4	36 00	1	16 00	6 50	9 00
Adjutant		63 33 1/3	4	36 00	1	16 00	6 50	9 00
Quartermaster		63 33 1/3	4	36 00	1	16 00	6 50	9 00
Commissary		63 33 1/3	4	36 00	1	16 00	6 50	9 00
First Lieutenant	Mounted.....	53 33 1/3	4	36 00	1	16 00	6 50	9 00
First Lieutenant	Not mounted.....	50 00	4	36 00	1	16 00	6 50	9 00
Second Lieutenant		53 33 1/3	4	36 00	1	16 00	6 50	9 00
Second Lieutenant	Not mounted.....	45 00	4	36 00	1	16 00	6 50	9 00
Chaplain		100 00	2	18 00				
Aid-de-Camp	To a major-general	24 00						
Aid-de-Camp	To a brigadier-general	*30 00						
Acting assist't commissary.		*20 00						

* Less one ration.—(See Note 4.)

NOTES.—1. Double rations are allowed by law to the General-in-Chief commanding the Army of the United States; to each general officer commanding in chief a separate army actually in the field; to each general officer commanding a geographical division embracing one or more geographical departments; and to each officer commanding a military geographical department. [Act August 23, 1842, sec. 4.] In the above table the rations of the General and the Lieutenant-General are doubled.

2. Every commissioned officer of the United States Army, including retired officers, is entitled to one additional ration per day for every five years' service. [Act March 2, 1857, sec. 9.]

3. The rations of surgeons and assistant surgeons are doubled after ten years' continuous service in the same grade. [Act June 30, 1834, sec. 3.] This is in addition to the longevity rations to which they would otherwise be entitled.

4. Subaltern officers, employed on the general staff and receiving increased pay therefor, are not entitled to the additional or fourth ration provided by the act of March 2, 1837, sec. 2.

5. Officers retired from active service are entitled to the pay proper of the highest staff or regimental rank held at time of retirement and four rations per day. [Act August 3, 1861, sec. 16.] Officers retired from active service for disability from wounds received in battle, upon the full rank of the command

THE ARMY.

annexed to the Army Register conformably to the resolution of the House of Representatives 30, 1842.

Number of horses for which forage is allowed.	TOTAL.		ACTS OF CONGRESS AND DECISIONS ESTABLISHING THE PRESENT RATES OF PAY AND ALLOWANCES.
	Compensation for month of 30 days.	Compensation for month of 31 days.	
\$30	\$1,296 00	\$1,321 20	July 25, 1866, sec. 2.
\$50	1,166 00	1,191 20	May 28, 1798, sec. 5; Aug. 21, 1842, sec. 6; Feb. 21, 1857, sec. 1; Feb. 29, 1864, sec. 2; decision of President of the United States, Oct. 29, 1855.
5	616 00	626 20	
5	481 00	486 70	{ Jan. 11, 1812, sec. 6; Apr. 24, 1816, sec. 12; G. O., July 8, 1816; Feb. 21, 1857, sec. 1; July 17, 1862, sec. 2; Mar. 3, 1865, sec. 1.
4	434 50	442 60	
4	326 50	331 00	{ Apr. 12, 1808, sec. 4; Apr. 24, 1816, sec. 12; G. O., July 8, 1816; Feb. 21, 1857, sec. 1; July 17, 1862, sec. 2; Mar. 3, 1865, sec. 1; and Mar. 2, 1867, sec. 1.
2	227 00	229 40	
2	203 00	205 10	{ June 30, 1834, sec. 2 and 3.
2	179 00	180 20	
2	215 00	218 00	{ June 30, 1834, sec. 2 and 3; July 28, 1866, sec. 17.
2	173 00	176 50	
2	137 50	139 00	Apr. 12, 1808, sec. 4; July 17, 1862, sec. 2; Mar. 2, 1867, sec. 1; Apr. 24, 1816, sec. 12; G. O., July 8, 1816; Mar. 2, 1827, sec. 1; Feb. 21, 1857, sec. 1; and Mar. 3, 1861, sec. 1.
2	127 50	129 00	Mar. 16, 1802, sec. 4 and 5.
2	130 83	132 33	Mar. 16, 1802, sec. 4.
2	130 83	132 33	Feb. 11, 1847, sec. 4. } Mar. 3, 1847, sec. 10. }
2	130 83	132 33	Mar. 3, 1863, sec. 37. }
2	120 83	122 33	Apr. 12, 1808, sec. 4; July 17, 1862, sec. 2; Mar. 2, 1867, sec. 1. }
2	117 00	119 00	Mar. 16, 1802, sec. 4 and 5. }
2	120 83	122 33	Apr. 12, 1808, sec. 4; July 17, 1862, sec. 2; Mar. 2, 1867, sec. 1. }
2	112 50	114 00	Mar. 16, 1802, sec. 4 and 5. }
2	118 00	118 60	July 28, 1866, sec. 30. }
2	24 00	24 00	Jan. 11, 1812, sec. 6. }
2	11 00	10 70	Apr. 12, 1808, sec. 4. } Mar. 2, 1867, sec. 2. }
2	11 00	10 70	Mar. 2, 1821, sec. 8. } Mar. 2, 1827, sec. 2. }

they held at the time such wounds were received, (Act July 28, 1866, sec. 32,) are entitled to the retired pay of that rank or grade. Retired officers assigned to appropriate duty by the President are entitled, while so assigned and employed, to the full pay and emoluments of the grade upon which they may have been retired. [Act July 17, 1862.]

6. Ten dollars additional pay per month is allowed to each "company officer" in actual command of a company. [Acts March 2, 1837, sec. 2; June 15, 1864, sec. 1.]

7. If a fixed salary has been given by law to any military employe of the Government while in active duty, and a defined military rank, either actual or assimilated, has also been conferred upon him by law, his rank and not his salary will control his pay on retirement. [Decision of the Second Comptroller of the Treasury, October 15, 1867.] This decision is applicable to all chaplains of the Army, holding the military rank of captain of infantry, under the provisions of section 7, act of March 2, 1867, when retired from active service.

8. The forage allowances to mounted officers for their horses are required by law to be drawn in kind from the Quartermaster's Department; but whenever commuted, because the quartermaster is unable to furnish in kind, the commutation value for each horse actually kept in use and allowed by law is \$9 per month. [Acts April 24, 1816, sec. 12; July 17, 1862, sec. 1.]

LETTER OF COLONEL MACKENZIE RELATIVE TO MATTERS
AT FORT SILL.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from Colonel Mackenzie relative to matters at Fort Sill.

MAY 15, 1876.—Referred to the Committee on Military Affairs.

JUNE 12, 1876.—Recommitted to the Committee on Military Affairs and ordered to be printed.

WAR DEPARTMENT, May 13, 1876.

The Secretary of War has the honor to transmit to the House of Representatives, for the Committee on Military Affairs, copy of an article from the New York Times relative to matters at Fort Sill, &c., forwarded by Colonel Mackenzie, with his reply to the editor in refutation, and a request for an investigation. Submitted to said committee at the suggestion of General Sherman.

ALPHONSO TAFT,
Secretary of War.

HEADQUARTERS FOURTH UNITED STATES CAVALRY,
Fort Sill, Ind. Ter., April 16, 1876.

SIR: I have the honor to inclose a slip taken from the New York Times of the 7th instant, and also a copy of a statement sent by me to the North for publication. This attack is undoubtedly made with the view of impressing on the minds of many excellent people in the North the horrors which would follow the transfer of the Indian Bureau to the War Department.

I very respectfully request that you will procure for me an investigation of this matter, and as it might be said just now that any one selected by the Secretary of War would be induced to prejudge the case in favor of the officers of the Army, as against the officials of the Board of Indian Commissioners, I very respectfully, but with entire deference to your judgment, suggest that some proper person be selected by the Secretary of State to make such examination.

Somebody deserves all the punishment that can be inflicted, and I know no one who would have greater contempt for the offenses with which myself and my officers stand charged, than Mr. Fish. In this matter, I do not wish to be understood as blaming Mr. Chandler, or any of his subordinates in the Interior Department. I trust and believe the

skirts of the agent, Mr. Hayworth, and of his employers, are clear of the crime which has been committed. As I understand it, the Board of Indian Commissioners is independent of the Secretary of the Interior.

I do not wish to annoy the President with any complaint of mine, but I cannot sit down and fold my hands under this. I therefore go to the honorable Secretary of War (through my military superiors) as the representative of the President, and claim for myself and my officers justice. My reason for mentioning Mr. Fish is just this: There is something wrong, and if the honorable Secretary of War names any one to look into the subject, it will be said, very possibly, that some one unfairly predisposed toward officers of the Army was mentioned, while, if the honorable Secretary of the Interior should have this matter investigated, he would perhaps be said to be favoring the officials of the board.

While I have every desire that nothing resulting from a complaint of mine be twisted or turned in any way so as to annoy the President, I believe that my command is, and has been, in a creditable condition, and I feel that we have been very much injured, and that these other officials should be dismissed.

I am, sir, very respectfully, your obedient servant,

R. S. MACKENZIE,
Colonel Fourth Cavalry.

The Hon. SECRETARY OF WAR,
Washington, D. C., (through intermediate channels.)

[Inclosures.]

THE ARMY AND THE INDIANS.—A WRETCHED STATE OF THINGS AT FORT SILL.—WORKING INDIANS IN THE VICINITY NOT PROPERLY PROTECTED.

In view of the proposition to transfer the Indian Bureau to the Army, the following extracts from letters of an agent of the Board of Indian Commissioners sent to examine matters at Fort Sill, will be of general interest. The charge is made that the Army does not protect the industrious Indians, within a mile of Fort Sill, from Texas cattle-thieves:

KIOWA AND COMANCHE AGENCY,
Fort Sill, March 19, 1876.

Fort Sill is a sort of young Sodom, and the garrison is mostly made up of men who neither fear God nor regard man. The Sabbath is disregarded entirely by them. Horse-racing on that day is a favorite pastime. On their grounds they have built a neat stone chapel, and it has not been used for any other purpose than a theater and a dance-hall. Drunkenness is prevalent. Evans takes in over his bar from \$200 to \$300 each day, and on pay-days a much larger sum. * * * I can only speak of their conduct as reckless and depraved. I am told that they sink much lower than the surface would indicate. Neither is there any distinction between the officers and the men. Perhaps the officers are the most at fault, as they set the example and fail to command the men to do right. The Indians have a great dread of being turned over to the military, and always ask about it when they see me. They say most emphatically that they are perfectly satisfied and do not wish a change.

FORT SILL, *March 14, 1876.*

The buildings are scattered over an area of about five miles.

In reference to the Kiowas and Comanches the writer states:

They are in earnest at their farm-work, and appear to take great interest in having homes, farms, and good crops. It seems to be a great pity that a people so well disposed, should suffer any drawbacks. They are subject to the constant raids of Texas bandits who steal their horses and mules and farming-stock within a mile of Fort Sill.

FORT SILL, March 16, 1876.

The military post Fort Sill is one mile from the agent's office. It is desirable to have the Indians and the military separated by a good distance. The influence of the common soldier is to destroy all morals and to corrupt all with whom he may come in contact. What Commissioner N. G. Taylor says in his report of 1868, with regard to the influence of the military on the Indians, is only too true of Fort Sill: "I know of no exception to the rule that the presence of military posts in the Indian country is speedily subversive of even the sternest ideas of Indian morals. The most loathsome, lingering, and fatal diseases which reach many generations in their ruinous effects, are spread broadcast, and the seeds of moral and physical death are planted among the miserable creatures." * * *

It may be proper to state that this location was chosen by the military. Six years ago they contracted for and had two warehouses, for Indian goods, built, for which they paid \$17,000. The frames and siding are all cottonwood, the floors oak. On the day that they were finished \$1,000 each was all that they were worth.

HEADQUARTERS FOURTH UNITED STATES CAVALRY,

Fort Sill, Ind. T., April 16, 1876.

SIR: I inclose a letter which I wish you would publish. As you know nothing of me I refer, without any authority, to either General F. C. Barlow, Robert Potter, Henry E. Davies, Martin McMahon, or Col. William Jay, all of whom knew me during the war, and, I think, would say that my character as a soldier then renders the truth of the statement of an official of the Board of Indian Commissioners, published in your issue of the 7th instant, very doubtful. I have never before written a life for publication, nor should I now, were it not that while all this investigation is going on, and so many reputations which have always seemed fair, appear to be breaking, I fear that were I to remain silent some very respectable people who are my friends, or those of my juniors, might dread lest all this wickedness had really been going on. There has been a great wrong done, but it is that a libel by a bad man, sent to your paper from the worst of motives.

I give you the names of the gentlemen to whom I refer, for the reason that from their knowledge in the past they could form a very fair opinion as to the probability of the statement made, showing very bad discipline, while no one of them has, for very many years, had any connection whatever with the Army.

I have no objection to the publication of this letter, also, if you wish it.

I am, sir, very respectfully,

RANALD S. MACKENZIE,
Colonel Fourth Cavalry, Commanding.

The EDITOR NEW YORK TIMES, New York City.

HEADQUARTERS FORT SILL, IND. T.,

April 16, 1876.

SIR: The inclosed extracts from a communication, dated at the "Kiowa and Comanche Agency, Fort Sill, Ind. T.," and published in the New York Times of the 7th instant, do my command as well as myself great injustice.

The preface to the article shows that it comes with either the indorsement of the Board of Indian Commissioners, or the authority of some of its officials. I do not propose, just now when investigations are going on, to rest quiet under attack.

The object is obvious. Those extracts were not published particularly for the sake of injuring me or my command, but to attack, through us, the Army, and for an evil purpose.

Broadly, the article in all its spirit and inference is not true, with, in some instances, just enough fact curiously garbled to furnish a sandy foundation.

This command is not depraved or bad. I am not in favor of drunkenness or disorder, or opposed to the Christian religion. I have requested, therefore, a careful investigation of this matter, and that some one be punished, either myself or the official who wrote the communication, and those who gave his statements to the press. Some one ought to be punished, for, either I am a very poor officer, or these people are bad men.

It is fully time that officers in the service of the Government be dealt with for grave offenses, in some more substantial form than by abuse in the papers.

Very respectfully, your obedient servant,

RANALD S. MACKENZIE,
Colonel Fourth United States Cavalry.

To the EDITOR OF THE NEW YORK TIMES.

[First indorsement.]

HEADQUARTERS, FORT SILL, I. T., April 16, 1876.

Respectfully forwarded through the assistant adjutant-general, Department of the Missouri.

R. S. MACKENZIE,
Colonel Fourth Cavalry, Commanding Post.

[Second indorsement.]

HEADQUARTERS DEPARTMENT OF THE MISSOURI,
Fort Leavenworth, Kans., April 24, 1876.

These papers are respectfully forwarded to the Adjutant-General of the Army (through office of the assistant adjutant-general, headquarters military division of the Missouri,) simply in deference to the wishes of Colonel Mackenzie, and not because I think there is any necessity for investigation, or that an officer of Colonel Mackenzie's well-earned and well-established reputation could in any way be injured by the libelous accusations of an anonymous newspaper correspondent.

JOHN POPE,
Brevet Major-General U. S. A., Commanding.

[Third indorsement.]

HEADQUARTERS MILITARY DIVISION OF MISSOURI,
Chicago, April 27, 1876.

Respectfully forwarded, out of consideration for Colonel Mackenzie, fully concurring with the indorsement of General Pope.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

[Fourth indorsement.]

HEADQUARTERS OF THE ARMY,
Washington, May 1, 1876.

Respectfully submitted to the Secretary of War, advising that this communication be sent to the Committee on Military Affairs instead of to the editor of the Times. I would not have our officers engage in a newspaper controversy, because those who prepare these slips will simply repeat their inventions *ad infinitum*.

General Mackenzie is too good an officer to be damaged in reputation by anonymous flings. He has kept the Kiowas, Comanches, &c., quiet now a whole year, a thing never accomplished heretofore.

W. T. SHERMAN,
General.

[Fifth indorsement.]

Seen by the Secretary of War May 5, 1876, who concurs in the views of the General.

H. T. CROSBY,
Chief Clerk.

Official copy.

E. D. TOWNSEND,
*Adjutant-General.*ADJUTANT-GENERAL'S OFFICE,
May 9, 1876.

JURISDICTION OF THE COURT OF CLAIMS.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

IN REFERENCE TO

The bill (H. R. 3481) "extending the jurisdiction of the Court of Claims, and for other purposes," with accompanying papers.

JUNE 13, 1876.—Referred to the Committee on Patents and ordered to be printed.

TREASURY DEPARTMENT, *Washington, D. C., June 12, 1876.*

SIR: I have the honor to acknowledge the receipt of your letter of the 30th ultimo, inclosing copy of the bill (H. R. 3481) "extending the jurisdiction of the Court of Claims," &c., together with executive documents, the same being transmitted for the consideration, information, and advice of this Department.

In compliance with your request that I submit my views with reference to the bill, I would say:

That I approve its apparent object, viz, the establishment of a tribunal and a method of procedure whereby parties owning or claiming patent rights which have been or may be used in the public service may establish the rights, prove the use, and through the judgment of the tribunal receive from the United States the compensation justly and equitably due for such use.

I am of the opinion that jurisdiction for this purpose may properly be given to the Court of Claims. The method of procedure proposed in the bill I understand has been approved by the Attorney-General, and, with some modifications for the further protection of the rights and interests of the United States, meets the approbation of the Commissioner of Patents.

In regard to the phraseology of the bill as clearly expressing its apparent intent, I desired to call the attention of the committee to those portions which are supposed to define the principle upon which the court shall award compensation or compute the sum to be paid to the claimant by the United States. While it seems intended that the sum to be paid shall not exceed in any case the value or profit derived by the United States from the use of the right, yet this purpose does not appear to me to be so clearly expressed that the court might not, in its

discretion, award compensation upon the principle of damage done to the claimant, as in suits in equity between private parties in the circuit courts. If this is not the intent of the act, I would suggest that a proviso be added to section 4, in substance as follows :

Provided, That the rate of compensation and the sum awarded by the court shall, in all cases admitting of such computation, be computed upon the basis of a reasonable royalty due for the use of the claimant's right ; and in no case shall the sum so awarded exceed the profit or benefit derived by the United States from the use of such right.

It appears to be the purpose of this contemplated legislation that no contracts shall hereafter be made with the owners of patent-rights for the use of such rights, but that when necessity or the interests of the Government shall require their use, they will be used without contract or the consent of the owners, who will be remitted to their remedy under this act. That in this way the officers of the Government may avoid the difficulty of deciding conflicting rights, and escape the danger of paying for an assumed right which may have no foundation in law.

Upon examination of the bill it is not found that the power of the several heads of the Departments, "or any other officer of the United States," to use patented inventions at their discretion, is in any way limited. This power, in connection with the provisions of section 12, that the judgments of the court, in the absence of a general appropriation for the payment of such judgments, may be paid out of any moneys in the Treasury not otherwise appropriated, gives to any officer the power to involve the United States in debt and consequent expenditure without the consent or provision of Congress, and to that extent limits the control of that body over the yearly expenses of the Government.

The objection to the permanent and indefinite appropriation provided in section 12 is, therefore, obvious. To retain for Congress as far as possible the control over the expenditure which will result from this act, I would recommend that section 12 be amended by striking out all from the twenty-first to the twenty-sixth line inclusive ; also by striking out in the fourteenth, fifteenth, and sixteenth lines the words "and shall thereupon be paid out of any general appropriation in relation to judgments of said Court of Claims or for private claims ;" and in lieu thereof insert, "and shall thereupon be paid out of the appropriations which shall annually be made for the payment of the judgments of said court rendered under the provisions of this act ;" so that said section, after the word "claims" in the twelfth line, shall read as follows: "And the same, when presented to the Secretary of the Treasury aforesaid, shall have the same effect as now provided by law, and shall thereupon be paid out of the appropriations which shall annually be made for the payment of the judgments of said court rendered under the provisions of this act ; and the payment of such judgment shall be in full satisfaction for all claims for compensation for the use of such patented invention or improvements up to the time of the making and entering of such judgment or decree thereon by said court, and no longer."

Whether or not the bill shall be amended as above, or if Congress shall decide that the results to be attained by a law of this nature will be so beneficial as to justify such a deviation from the law which forbids the payment of any moneys or the incurring any debt for ordinary expenses of the Government in excess of the annual appropriations, it seems to me important that in this bill, or in some independent act, the discretionary power to use patented inventions should be confided only to the heads of the several Executive Departments, and that all subordinate officers should be forbidden to use them unless previously authorized by the written instructions of their official head. If confined

to heads of Departments the responsibility will be limited to a few persons, and it may be presumed that the power will be exercised with greater care and deliberation than if intrusted to the many subordinates.

In compliance with your request I inclose a copy of your letter of May 30. The printed documents (five in number) accompanying your communication are herewith returned.

Very respectfully,

B. H. BRISTOW,
Secretary.

Hon. SAMUEL A. DOBBINS,
Chairman Subcommittee on Patents, House of Representatives.

HOUSE OF REPRESENTATIVES,
COMMITTEE ROOM ON PATENTS,
Washington, D. C., May 30, 1876.

SIR: Herewith inclosed I have the honor to transmit to you for consideration, information, and advice House bill No. 3481, "Extending the jurisdiction of the Court of Claims of the United States, and for other purposes." This bill is now pending before the Committee on Patents, and has been referred to a subcommittee of which I am chairman.

It has been deemed advisable to submit this bill to you for the purposes above indicated. Will you, therefore, please examine it and return the same at an early day, with such recommendations as you may be pleased to make with reference to the matter contained therein.

To aid you in such examination and to facilitate action thereon, I inclose herewith several executive documents printed by the order of the House and relating to such bill, and now before the above-named committee, the same having been there referred by the order of the House.

Please return with your answer hereto the inclosed bill and a true copy of this letter; also the inclosures, four in number.

I have the honor to be, very respectfully, your obedient servant,
SAMUEL A. DOBBINS,

Chairman of Subcommittee on Patents.

The Hon. SECRETARY OF THE TREASURY.

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NECESSARY APPROPRIATIONS.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

URGING UPON

Congress some remedial action to continue the functions of the Government in case the annual appropriation bills are not perfected by the close of the present fiscal year, and transmitting a joint resolution relative thereto.

JUNE 17, 1876.—Referred to the Committee on Appropriations and ordered to be printed

To the Senate and House of Representatives :

The near approach of a new fiscal year, and the failure of Congress up to this time to provide the necessary means to continue all the functions of government, makes it my duty to call your attention to the embarrassments that must ensue if the fiscal year is allowed to close without remedial action on your part.

Article I, section 9, of the Constitution declares :

No money shall be drawn from the Treasury but in consequence of appropriations made by law.

To insure economy of expenditures and security of the public treasure, Congress has from time to time enacted laws to restrain the use of public moneys, except for the specific purpose for which appropriated, and within the time for which appropriated; and to prevent contracting debts in anticipation of appropriate appropriations.

Revised Statutes, section 3679, provides :

No Department of the Government shall expend, in any one fiscal year, any sum in excess of appropriations made by Congress for that fiscal year, or involve the Government in any contract for the future payment of money in excess of such appropriations.

Section 3732 provides :

No contract or purchase on behalf of the United States shall be made, unless the same is authorized by law or is under an appropriation adequate to its fulfillment, except in the War and Navy Departments, for clothing, subsistence, forage, fuel, quarters, or transportation, which, however, shall not exceed the necessities of the current year.

Section 3678 as follows :

All sums appropriated for the various branches of expenditure in the public service shall be applied solely to the objects for which they are respectively made, and for no others.

Section 3690 that—

All balances of appropriations contained in the annual appropriation bills, and made specifically for the service of any fiscal year, and remaining unexpended at the

expiration of such fiscal year, shall only be applied to the payment of expenses properly incurred during that year, or to the fulfillment of contracts properly made within that year; and balances not needed for such purposes shall be carried to the surplus fund. This section, however, shall not apply to appropriations known as permanent or indefinite appropriations.

The effect of the laws quoted, taken in connection with the constitutional provision referred to, is, as above stated, to prohibit any outlay of public money toward defraying even the current and necessary expenses of Government after the expiration of the year for which appropriated, excepting when those expenses are provided for by some permanent appropriation, and excepting in the War and Navy Departments, under section 3732.

The number of permanent appropriations are very limited, and cover but few of the necessary expenditures of the Government.

They are nearly all, if not quite all, embraced in sections 3687, 3688, and 3689 of the Revised Statutes. That contained in section 3687 is applicable to *expenses of collecting the revenue from customs*; that in section 3688 to the payment of interest on the *public debt*; and that in section 3689 to various objects too numerous to detail here.

It will be observed that while section 3679, quoted above, provides that *no* Department shall in any one fiscal year involve the Government in any contract for the future payment of money in excess of the appropriation for that year, section 3732, also quoted above, confers, by clear implication, upon the heads of the War and Navy Departments full authority, even in the absence of any appropriation, to purchase or contract for clothing, subsistence, forage, fuel, quarters, or transportation not exceeding the necessities of the current year. The latter provision is special and exceptional in its character, and is to be regarded as excluded from the operation of the former more general one. But if any of the appropriation bills above enumerated should fail to be matured before the expiration of the current fiscal year, the Government would be greatly embarrassed for want of the necessary funds to carry on the service. Precluded from expending money not appropriated, the Departments would have to suspend the service, so far as the appropriations for it should have failed to be made.

A careful examination of this subject will demonstrate the embarrassed condition all branches of the Government will be in—and especially the executive—if there should be a failure to pass the necessary appropriation bills before the 1st of July, or otherwise provide.

I commend this subject most earnestly to your consideration, and urge that some measure be speedily adopted to avert the evils which would result from non-action by Congress. I will venture the suggestion, by way of remedy, that a joint resolution, properly guarded, might be passed through the two houses of Congress, extending the provisions of all appropriations for the present fiscal year to the next in all cases where there is a failure on the 1st of July to supply such appropriation; each appropriation so extended to hold good until Congress shall have passed a corresponding appropriation applicable to the new fiscal year, when all moneys expended under laws enacted for this fiscal year shall be deducted from the corresponding appropriation for the next.

To make my ideas on this subject more clear I have caused to be drawn up a "joint resolution" embodying them more fully.

U. S. GRANT.

EXECUTIVE MANSION, June 17, 1876.

JOINT RESOLUTION to provide for defraying, temporarily, the ordinary and necessary expenses of the public service.

Whereas the ordinary and necessary expenses of the public service, in its various branches, comprising, among others, the expenses which especially pertain to the legislative, executive, and judicial departments of the Government, to the consular and diplomatic service, to the postal service, to the support of the Army, and to the maintenance of the Navy, are generally met by annual appropriations which expire at the end of the current fiscal year; and

Whereas no public funds will be available to defray these expenses as the same shall accrue after that period, unless appropriations shall have been previously made therefor by law; and

Whereas to avoid the great embarrassment to the public service that might otherwise ensue, it is expedient to make provision for defraying, temporarily, such of these expenses as would be unprovided for in case some one of the usual annual appropriation bills designed to provide therefor should fail to be matured by the end of the fiscal year now current: Therefore,

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That in case any of the following appropriation bills for the fiscal year ending June 30, 1877, shall not have passed by the commencement of such year, so that the funds to be appropriated thereby may then be available for expenditure, that is to say, the bill providing for the legislative, executive, and judicial expenses; the bill providing for the consular and diplomatic expenses; the bill providing for the service of the Post-Office Department; the bill providing for the support of the Army; and the bill providing for the naval service, the appropriation act for the current fiscal year corresponding in its general description and object to such appropriation bill shall extend to the fiscal year next ensuing until such appropriation bill is enacted and takes effect, to the end that the provisions of such appropriation act which apply to the ordinary and necessary expenses of the public service for the current fiscal year, shall in like manner be applicable to similar expenses which may accrue during the period intervening between the end of the current fiscal year and the time when such appropriation bill for the next ensuing fiscal year shall be enacted and take effect.

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EXTRADITION TREATY BETWEEN THE UNITED STATES
AND GREAT BRITAIN.

M E S S A G E

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RELATION TO

The extradition treaty with Great Britain.

JUNE 20, 1876.—Referred to the Committee on Foreign Affairs and ordered to be printed.

To the Senate and House of Representatives :

By the tenth article of the treaty between the United States and Great Britain, signed in Washington on the 9th day of August, 1842, it was agreed that the two governments should, upon mutual requisitions respectively made, deliver up to justice all persons who, being charged with certain crimes therein enumerated, committed within the jurisdiction of either, should seek an asylum or be found within the territories of the other.

The only condition or limitation contained in the treaty to the reciprocal obligation thus to deliver up the fugitive was that it should be done only upon such evidence of criminality as, according to the laws of the place where the fugitive or person so charged should be found, would justify his apprehension and commitment for trial, if the crime or offense had there been committed.

In the month of February last a requisition was duly made, in pursuance of the provisions of the treaty, by this Government upon that of Great Britain for the surrender of one Ezra D. Winslow, charged with extensive forgeries and the utterance of forged paper, committed within the jurisdiction of the United States, who had sought an asylum and was found within the territories of Her Britannic Majesty, and was apprehended in London. The evidence of the criminality of the fugitive was duly furnished and heard, and being found sufficient to justify his apprehension and commitment for trial, if the crimes had been committed in Great Britain, he was held and committed for extradition.

Her Majesty's government, however, did not deliver up the fugitive in accordance with the terms of the treaty, notwithstanding every requirement thereof had been met on the part of the United States, but, instead of surrendering the fugitive, demanded certain assurances or stipulations not mentioned in the treaty, but foreign to its provisions, as a

condition of the performance by Great Britain of her obligations under the treaty.

In a recent communication to the House of Representatives, and in answer to a call from that body for information on this case, I submitted the correspondence which has passed between the two governments with reference thereto. It will be found in Executive Document No. 173 of the House of Representatives of the present session, and I respectfully refer thereto for more detailed information bearing on the question.

It appears from the correspondence that the British government bases its refusal to surrender the fugitive and its demand for stipulations or assurances from this Government on the requirements of a purely domestic enactment of the British Parliament passed in the year 1870.

This act was brought to the notice of this Government shortly after its enactment, and Her Majesty's government was advised that the United States understood it as giving continued effect to the existing engagements under the treaty of 1842 for the extradition of criminals; and, with this knowledge on its part and without dissent from the declared views of the United States as to the unchanged nature of the reciprocal rights and obligations of the two powers under the treaty, Great Britain has continued to make requisitions and to grant surrenders in numerous instances without suggestion that it was contemplated to depart from the practice under the treaty which has obtained for more than thirty years, until now, for the first time, in this case of Winslow, it is assumed that under this act of Parliament Her Majesty may require a stipulation or agreement not provided for in the treaty as a condition to the observance by her government of its treaty obligations toward this country.

This I have felt it my duty emphatically to repel.

In addition to the case of Winslow, requisition was also made by this Government on that of Great Britain for the surrender of Charles J. Brent, also charged with forgery committed in the United States and found in Great Britain. The evidence of criminality was duly heard and the fugitive committed for extradition.

A similar stipulation to that demanded in Winslow's case was also asked in Brent's, and was likewise refused.

It is with extreme regret that I am now called upon to announce to you that Her Majesty's government has finally released both of these fugitives, Winslow and Brent, and set them at liberty, thus omitting to comply with the provisions and requirements of the treaty under which the extradition of fugitive criminals is made between the two governments.

The position thus taken by the British government, if adhered to, cannot but be regarded as the abrogation and annulment of the article of the treaty on extradition.

Under these circumstances it will not, in my judgment, comport with the dignity or self respect of this Government to make demands upon that government for the surrender of fugitive criminals, nor to entertain any requisition of that character from that government under the treaty.

It will be a cause of deep regret if a treaty which has been thus beneficial in its practical operation, which has worked so well and so efficiently, and which, notwithstanding the exciting and at times violent political disturbances of which both countries have been the scene during its existence, has given rise to no complaints on the part of either government against either its spirit or its provisions, should be abruptly terminated.

It has tended to the protection of society and to the general interests of both countries. Its violation or annulment would be a retrograde step in international intercourse.

I have been anxious and have made the effort to enlarge its scope, and to make a new treaty which would be a still more efficient agent for the punishment and prevention of crime. At the same time I have felt it my duty to decline to entertain a proposition made by Great Britain, pending its refusal to execute the existing treaty, to amend it by practically conceding by treaty the identical conditions which that government demands under its act of Parliament. In addition to the impossibility of the United States entering upon negotiations under the menace of an intended violation or a refusal to execute the terms of an existing treaty, I deemed it unadvisable to treat of only the one amendment proposed by Great Britain, while the United States desires an enlargement of the list of crimes for which extradition may be asked, and other improvements which experience has shown might be embodied in a new treaty.

It is for the wisdom of Congress to determine whether the article of the treaty relating to extradition is to be any longer regarded as obligatory on the Government of the United States or as forming part of the supreme law of the land. Should the attitude of the British government remain unchanged, I shall not, without an expression of the wish of Congress that I should do so, take any action either in making or granting requisitions for the surrender of fugitive criminals under the treaty of 1842.

Respectfully submitted.

U. S. GRANT.

WASHINGTON, *June 20, 1876.*

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BUREAU OF REFUGEES, FREEDMEN, AND ABANDONED
LANDS.

[To accompany H. Res. 128.]

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A communication from the Assistant Adjutant-General of the Army in charge of the late Bureau of Refugees, Freedmen, and Abandoned Lands, and recommending such legislation as will enable the officers of the Treasury Department to make new settlements in favor of certain colored claimants.

JUNE 9, 1876.—Referred to the Select Committee on the Freedman's Bank.

JUNE 20, 1876.—Recommitted to the Committee on the Freedman's Bank and ordered to be printed.

WAR DEPARTMENT,
June 7, 1876.

The Secretary of War has the honor of transmitting to the House of Representatives a communication from the Assistant Adjutant-General in charge of the late Bureau of Refugees, Freedmen, and Abandoned Lands, requesting such legislation as will enable the accounting-officers of the Treasury to make new settlements in favor of certain colored claimants, in cases where it may be shown that they have not received from the late Freedmen's Bureau the payments and funds represented by the vouchers now filed with the Second Auditor.

In explanation, attention is invited to the correspondence between the War Department and the honorable Secretary of the Treasury on the subject, and the recommendation of the Adjutant-General's Office for early action.

H. T. CROSBY,
Chief Clerk,
For the Secretary of War, in his absence.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, D. C., June 6, 1876.

GENERAL: Referring to the subject of complaint cases, or those in which claimants allege that they have not received from the late Bureau of Refugees, Freedmen, and Abandoned Lands their pay and bounty-money, although the records of the Treasury Department show settlement of their claims, and vouchers have been filed by the late bureau as evidence of payment; and wherein there has been fraud on claimants whereby they have been deprived of the moneys awarded them by the United States, I have the honor to submit the subject, in order that the honorable Secretary of War may place it before Congress, with the view to such legislation as will enable the accounting-officers to make new settlements in cases where it may be shown that the claimants have not, in fact, received the payments represented by the vouchers filed in their respective claims.

The amount thus far involved is \$64,610.94, as follows:

Aggregate amount of claims that have been reported to the Second Auditor.....	\$49,390 80
Reported to Second Auditor in cases where funds were not paid to claimants, but returned to the chief disbursing-officer by local agents.....	15,220 14
	64,610 94

A draught of a joint resolution herewith, marked A, will point to what is deemed necessary.

In order to a full understanding of the subject, it will be necessary to refer to the following summary:

Soon after the transfer of the late bureau to this office, the complaints had their initial, and the Adjutant-General's Office viewed that it could not take cognizance of any claims which the records of that bureau indicated as paid. The complaints of non-payment were transmitted to the Second Auditor of the Treasury, and on April 10, 1873, that officer addressed the following letter:

TREASURY DEPARTMENT,
SECOND AUDITOR'S OFFICE,
Washington, April 10, 1873.

SIR: I have the honor to state that numerous complaints are being made to this office by colored soldiers, or their heirs, of the non-receipt of their pay and bounty-money, although the records of the office show settlements of their claims, and the records of the late Freedmen's Bureau show payment of the proceeds of the Treasury certificates to the claimants.

Evidence presented to this office, as well as before the court-martial convened at Louisville, Ky., for the trial of John L. Graham and Benj. P. Runkle, shows conclusively that certain claimants have been defrauded of their money, and that in some instances the receipts and vouchers upon which the money is claimed to have been paid are false and fictitious, or procured upon fraudulent representations.

Under the act of Congress approved March 30, 1867, the settlement of the claims and payment to the Commissioner of the Freedmen's Bureau, is regarded as relieving the accounting-officers of the Treasury of further responsibility relating to the payment of the claims; but as these parties have valid claims against the Government, which ultimately will have to be paid, the question arises, what action shall the Government now pursue upon these complaints, with a view to its own protection and that of the claimants; whether the cases shall be investigated and prosecuted under the direction of the Secretary of War, or under the direction of the Secretary of the Treasury, through the Department of Justice?

As there are some cases now before me, in which criminal action is not barred by the statute of limitations, immediate action needs to be required; and this letter is addressed to you, that I may be informed of your views upon the subject.

I have the honor to be, very respectfully, your obedient servant.

E. B. FRENCH, Auditor.

The Hon. SECRETARY WAR.

Under date of April 15, 1873, reply was made by the Adjutant-General as follows :

WAR DEPARTMENT, ADJUTANT GENERAL'S OFFICE,
Washington, D. C., April 15, 1873.

SIR : Referring to your letter of the 10th instant, as to complaints by colored claimants of the non-receipt of their pay and bounty-money, the records showing adjustment of the claims, and payment of the same, and asking whether "the cases shall be investigated and prosecuted under the direction of the Secretary of War or under the direction of the Secretary of the Treasury," I have to inform you that the Acting Secretary of War has decided that the War Department, through the Department of Justice, will undertake the prosecution of the parties connected with the preparation of the "false and fictitious" receipts and vouchers, or the "fraudulent representations."

To that end I will be pleased to have you transmit, through me, for the Secretary of War, all papers and evidence in your office bearing upon the cases.

Concert of action will be maintained, of course, between the Treasury and War Departments, through the proper officers, during the action now contemplated.

I am, very respectfully, your obedient servant,

E. D. TOWNSEND,
Adjutant-General.

The SECOND AUDITOR, *United States Treasury.*

On May 31, 1873, the Secretary of War placed the subject before the Attorney-General, and that officer in his opinion to Secretary of War said :

But the joint resolution of 1867 is very explicit. All money paid under that act is paid directly to the Commissioner, and it is enacted that "he shall be responsible for the safe custody and faithful disbursement of the fund intrusted to him." Nothing is said about any of the assistant commissioners, or about any disbursing officer, and although it was probably necessary, and undoubtedly was lawful, for the Commissioner to appoint and employ disbursing officers beside himself, nevertheless he is responsible civilly under this act for their acts, the same as if done by himself; and even if he took bonds from them directly to the Government, this cannot relieve him of such liability. The Government may enforce both securities in order to indemnify itself for any loss which, through the default of a subordinate officer, it may have suffered. This liability might, in some respects, be enlarged by the terms of the bond given by the Commissioner, but it, of course, could not be in the least diminished.

The Commissioner of the Freedmen's Bureau, therefore, is liable for all the losses sustained by the Government through the default of a subordinate disbursing officer, or other person employed by him in the disbursement of the moneys intrusted to him under the joint resolution of 1867.

When the subject reached the Howard court of inquiry, the court decided not to take testimony or to go into an examination to ascertain whether or not the complaints in the cases, then numbering one hundred and seventy-four, were valid, and the court found that the "Treasury officials testify that all these cases can be settled in the usual manner by them and were actually in process of settlement at the time [March 3, 1874] when this court met."

The subject thus stood, under the testimony of the accounting officers that they could (without further legislation) settle the cases, and that they were in actual process of settlement, until December, 1875, when the Secretary of War addressed the Secretary of the Treasury as follows :

WAR DEPARTMENT,
Washington City, December 18, 1875.

SIR : I have the honor to state that numerous complaints received at this Department and at the Office of the Second Auditor of the Treasury, from colored ex-soldiers and their representatives, alleging the non-receipt of their bounty, &c., which is shown by the records of the late Bureau Refugees, Freedmen and Abandoned Lands to have been paid to them, led to an arrangement, in April, 1873, between this Department and the Second Auditor, under which the original Treasury certificates issued in settlement of the claims referred to, the vouchers representing their payment, and any other necessary papers, furnished by the Auditor to this Department, have been regularly referred to the Department of Justice for such investigation as might be practicable, with the view of determining whether the complainants (claimants) had or had not, in fact, received payment of their claims.

Some one hundred and fifty (150) cases have been thus referred to the Department of Justice, a number of which have been received back and returned to the Auditor with evidence establishing, conclusively, that payment to the claimants has never been made.

In addition to the above, there were a large number of cases, representing a large aggregate sum, which it was discovered in the regular course of business in the Adjutant General's Office had not been paid, although vouchers representing payment had been filed by George W. Balloch, late chief disbursing officer Bureau Refugees, Freedmen and Abandoned Lands, with the accounting officers of your department, but that funds for payment of those cases, which had been sent by said George W. Balloch to various local agents of the bureau, had been by them returned to him, because of their inability to discover the claimants. These cases were duly and fully reported to the Second Auditor of the Treasury, for such action as, in his judgment, the importance of the subject might demand.

As yet, however, so far as this Department is informed, no relief has been afforded to any of the claimants of either class above referred to, some of whom are constantly writing to this Department, complaining of the hardship to which they have been subjected, and urging payment of the amounts to which they are entitled, under the evident belief that the responsibility for their payment, as well as for the unjust delay, attaches to this Department.

In consideration of the facts, as stated, and of the fact that the final disposition of the claims in question, by new settlements or otherwise, of necessity devolves upon the accounting officers of your Department, the subject is thus presented to you with the view to such action on your part as will place this Department in the possession of information as to the action contemplated by those officers, in cases of the claimants where it has been shown that they have never received payment, and the probable time that will elapse before such cases are finally disposed of.

It is respectfully submitted that simple justice to the claimants, who have already been too long deprived of their dues, entitles their claims to the most prompt and favorable consideration that a proper regard for the public interests will permit.

If under the existing laws the claimants can receive their dues, steps looking thereto should be taken. If, on the contrary, further legislation is requisite, action should be had looking to that.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The Hon. SECRETARY OF THE TREASURY.

Under date of December 21, 1875, the Secretary of the Treasury replied as follows:

TREASURY DEPARTMENT, December 24, 1875.

SIR: I have the honor to inform you that your letter of the 18th instant, concerning complaints of colored ex-soldiers alleging non-receipt of their bounty, has been received at this office and referred to the Second Auditor of this Department.

Very respectfully,

B. H. BRISTOW, *Secretary.*

Hon. W. W. BELKNAP,
Secretary of War.

On February 9, 1876, the Secretary of the Treasury was again addressed as follows:

WAR DEPARTMENT,
Washington City, February 9, 1876.

SIR: Referring to my letter of December 18th last, respecting certain complaints of colored ex-soldiers, &c., alleging the non-receipt of bounty, represented by vouchers filed in the Treasury Department to have been paid to them by the late Bureau Refugees, Freedmen and Abandoned Lands, I have the honor to invite attention to the fact that no information of the action had thereon been received at this Department further than that conveyed by your letter of the 24th December, stating that mine of the 18th had been referred to the Second Auditor of the Treasury.

Upon the considerations that led to my previous letter, as therein stated, is now based the request that this Department may be furnished at the earliest practicable date with a reply covering the points of inquiry therein submitted.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The Hon. SECRETARY OF THE TREASURY.

Again, under date of March 29, 1876, no reply having to that date been received, the Secretary of the Treasury was addressed as follows:

[Special.]

WAR DEPARTMENT,
Washington City, March 29, 1876.

SIR: Referring to communications from this Department, dated, respectively, December 18, 1875, and February 9, 1876, relative to complaints of colored ex-soldiers, alleging the non-receipt of their bounties, &c., represented by vouchers filed in the Treasury Department to have been paid to them by the late Bureau of Refugees, Freedmen and Abandoned Lands, I have the honor to invite attention to the fact that to this time this Department has no reply or information in the matter further than that contained in your letter of December 24, stating that War Department letter of December 18 had been referred to the Second Auditor of the Treasury.

Viewing the subject as one involving important interests, fully referred to in previous communications, I beg to express the hope that such action as may be contemplated or necessary on the part of the accounting-officers may be had with the least possible delay, and that this Department may be promptly advised thereof.

With much respect, your obedient servant,

ALFONSO TAFT,
Secretary of War.

The Hon. SECRETARY OF THE TREASURY.

Replies were received as follows:

TREASURY DEPARTMENT, March 31, 1876.

SIR: I have the honor to acknowledge the receipt of your letter of the 29th instant, again calling my attention to your letter of December 18, 1875, relative to complaints of colored ex-soldiers, alleging the non-receipt of their bounties, &c., represented by vouchers filed in this Department, and asking that you may be informed as to the action that may be contemplated or thought necessary on the part of the accounting-officers.

Immediately upon the receipt of your letter first mentioned, I again called upon the Second Auditor for a report on the subject-matter, and I hand you herewith his reply, dated the 30th instant, which, it is thought, embraces all the information desired by your Department in this matter, and also explains the cause of the delay in making the report.

Very respectfully,

B. H. BRISTOW,
Secretary.

Hon. ALFONSO TAFT,
Secretary of War.

SECOND AUDITOR'S OFFICE OF THE TREASURY DEPARTMENT,
March 30, 1876.

SIR: I have the honor to return herewith the letter of the Secretary of War of December 18, 1876, relating to the complaints "from colored ex-soldiers and their representatives, alleging the non-receipt of their bounty, &c., which is shown by the records of the late Bureau of Refugees, Freedmen and Abandoned Lands to have been paid to them."

By the joint resolution of Congress "in reference to the collection and payment of moneys due colored soldiers, sailors, and marines, or their heirs," approved March 29, 1867, it is provided "that all checks and Treasury certificates to be issued in the settlement of claims for pay, bounty, prize-money, or other moneys due to colored soldiers, sailors, or marines, or their legal representatives, now residing, or who may have resided, in any State in which slavery existed in the year 1860, the claim for which has been or may be prosecuted by an agent or attorney, shall be made payable to the Commissioner of the Freedmen's Bureau, who shall pay the said agent or attorney his lawful fees and expenses, and shall hold the balance subject to the order of the claimants, on satisfactory identification; but no money shall be paid to any person except the claimant, or his or her legal representatives, if deceased; nor shall any power of attorney, transfer, or assignment of the amount of said claims, or any part thereof, be recognized or allowed by the Commissioner, or by any officer or agent acting under him; and it shall be the duty of the said Commissioner, the officers and agents of the Freedmen's Bureau, to facilitate, as far as possible, the discovery, identification, and payment of the claimants."

The second section provides "that the Commissioner of the Freedmen's Bureau shall be held responsible for the safe custody and disbursement of the funds hereby intrusted to him," and, after prescribing rules for settling with the attorney or agent of the claimant for fees and advances, also provides that "when the claimant shall have been properly identified and his account is ready for settlement, the balance due shall be paid in current funds and not in checks or drafts."

The resolution defines the powers and duties of the accounting-officers of the Treasury and of the Commissioner of the Freedmen's Bureau. All settlements were made in strict

compliance with it, and all certificates issued were in the name of General O. O. Howard, Commissioner of the Freedmen's Bureau, for the applicants. When this was done in any case, it is believed that the powers and duties of the accounting-officers are exhausted by such settlement, and that in a case where the Commissioner has filed vouchers showing payment to any soldier or his heirs, and the payment is denied to have been made and is again claimed by him, no new settlement can be made without further authority of Congress.

The only remedy existing at present seems to be against the Commissioner, (who was charged with the safe-keeping and disbursement of the money allowed by such settlements, and drawn by him,) when it has been satisfactorily ascertained that the claimants have not received the money for which vouchers have been furnished by him. In view of this, when a complaint of non-payment is received at this office, an investigation is at once commenced, and where a satisfactory conclusion cannot be reached by it, the case is forwarded to the War Department, to be referred to the Department of Justice for investigation.

There are now one hundred and thirteen cases in the hands of different United States attorneys, sixty of which are with the United States attorney for the district of Kentucky, nineteen are with the attorney for the western district of Missouri, seventeen are with the district attorney for Louisiana, nine with the district attorney for Mississippi, and the remainder are scattered in the several States.

About forty cases have been investigated and returned, and in twenty of these charges have been raised against the Commissioner, General O. O. Howard. He has also been charged in ninety-three other cases, where the vouchers furnished by him have been shown to have been false by the records of the late bureau, but there are very few of these ninety-three cases in which complaint has been made to this office of the non-receipt of the money by the original claimants.

There are also one hundred and thirty-nine cases now under examination in this office which have not been reported to the War Department or Department of Justice. In some of these cases the receipt of a portion of the money is admitted.

In some of these cases, reported by the War Department to this office, no complaint has been received; in many no replies to letters from this office have been received, while in others the notice that fraud is supposed to exist, is not of such a character as to warrant an expensive investigation.

I have not deemed it advisable to report a transcript of the account against the Commissioner, General O. O. Howard, to the Comptroller for suit, in view of the fact that, in so large a number of the cases transmitted to the Department of Justice for investigation, no report has yet been received, and as the number already reported is small, compared with the number under investigation.

It is presumed that the investigation of those cases will be prosecuted as rapidly as is practicable, and that it is not desirable to multiply suits against the Commissioner for the recovery of the money.

If a different opinion is entertained by you, the present condition of the account is such that it can be immediately reported for suit.

I sincerely regret the delay and the causes that have existed for a delay in making a report upon the letter of the Secretary of War.

About the time that the letter was received, I was consulted by the law-clerk of the Second Comptroller in relation to a reply to a letter from the Secretary of War, which I understood was of a similar import and addressed to the Comptroller; and being under the impression that the opinion of my superior officer must render such a report unnecessary, and being constantly occupied by my official duties, I gave the matter no further thought until called upon subsequently for a report.

I commenced it immediately, but found that it would be necessary to procure information from the files of the office, and directed a competent clerk to obtain it for me. This required considerable examination, and his work was interrupted by his forced attendance at court, so that several days elapsed before the information was obtained. Since that time I have been constantly occupied with pressing official duties, which, with illness and domestic affliction, have united to drive the subject from my mind.

Repeating the expression of my sincere regret, and with the assurance that there was no intentional delay in making the reply,

I am, sir, very respectfully,

E. B. FRENCH, Auditor.

A decision that legislation by Congress was requisite was thus reached, and the Secretary of War asked the Secretary of the Treasury to place the subject before Congress, with the view to certain legislation, by the following letter:

WAR DEPARTMENT,
Washington City, April 27, 1876.

SIR: I have the honor to acknowledge the receipt of your letter of the 31st ultimo, inclosing copy of the report of the Second Auditor of the Treasury, relative to claims for bounty, &c., of colored ex-soldiers represented by vouchers filed with the accounting-offi-

cers of the Treasury, to have been paid through the late Bureau of Refugees, Freedmen, and Abandoned Lands, but in which the claimants deny having ever received payment.

As from said report it appears that new settlements in the cases referred to cannot be made, "without further authority of Congress," and that "the only remedy existing at present seems to be against the Commissioner, when it has been satisfactorily ascertained that the claimants have not received the money for which vouchers have been furnished by him," it is respectfully urged that you will place the subject before Congress with the view to such legislation as will invest the accounting-officers with authority to issue new settlements in cases where it may be shown that the claimants did not in fact receive the payment represented by the vouchers filed in their respective claims.

The amount thus far involved is \$64,610.94, as follows :

Aggregate amount of claims that have been reported to the Second Auditor...	\$49,390 50
Cases reported to Second Auditor in cases where funds were not paid to claimants, but returned to the chief disbursing-officer by local agents.....	15,220 14
	64,610 94

I need hardly suggest that considerations of justice to the claimants who have already suffered from long deprivation of their just dues, and who must endure greater hardship if forced to await the result of a protracted suit against the late Commissioner, should lead to prompt and earnest attention to this matter.

I will thank you to inform me of such action as may be taken by you under the request herein contained.

With much respect your obedient servant,

ALPHONSO TAFT,
Secretary of War.

The Hon. SECRETARY OF THE TREASURY.

On May 12, 1876, the Secretary of the Treasury replied as follows :

TREASURY DEPARTMENT, *May 12, 1876.*

SIR: I have the honor to acknowledge the receipt of your letter of the 27th ultimo, relative to claims for bounty, &c., of colored ex-soldiers, represented by vouchers filed with the accounting-officers of the Treasury to have been paid through the late Bureau Refugees, Freedmen, and Abandoned Lands, but in which the claimants deny having ever received payment.

As no new settlements can be made in these cases without further legislation, you urge that the subject be placed before Congress by this Department, with a view to obtaining such legislation as will invest the accounting-officers of this Department with authority to issue new settlements in cases where it may be shown that the claimants did not, in fact, receive the payments represented by the vouchers filed with their respective claims.

In reply, I have the honor to inform you that, under the peculiar system by which the claims for bounty, &c., to which you refer, were settled and paid, the money arising therefrom was turned over by this Department to the Commissioner of the Bureau Refugees, Freedmen, and Abandoned Lands, and their amounts then became charges in his accounts.

In making disbursements of this money, it is alleged that the Commissioner paid out a portion thereof upon improper identification of the claimants. It is held that the Commissioner is personally responsible for such erroneous payments; but, until the amount shall have been recovered from him, the proper claimant is debarred from receiving his just and proper dues.

From this it appears that the purpose of the legislation, which you ask me to urge, is to remove certain difficulties arising from an alleged improper payment by the said Commissioner of money received by him upon adjusted claims, as before stated.

As the Commissioner was an officer of your Department, and the settlement of the affairs of the bureau, through which he made the disbursements in question, has been by law turned over to your Department, it seems to me that any further legislation needed to enable you to complete the administration of the duties arising therefrom should be presented to Congress through your Department, which has in its possession all the records and facts pertaining to the matter upon which the recommendation for additional legislation must necessarily be based.

Very respectfully,

B. H. BRISTOW,
Secretary.

Hon. ALPHONSO TAFT,
Secretary of War.

Thus the claimants have been deprived of their just dues for several years, including the time during which the subject rested with the late bureau, and the two years which have elapsed since the accounting-

officers testified that they could settle the claim in the usual manner, and that they were in process of settlement. It is therefore hoped that Congress will promptly legislate as suggested by this communication.

Very respectfully, general, your obedient servant,

THOMAS M. VINCENT,

Assistant-Adjutant General.

To the ADJUTANT-GENERAL OF THE ARMY,

Washington, D. C.

A.

A RESOLUTION authorizing the settlement of the claims for pay, bounty, prize-money, or other moneys due to colored soldiers, sailors, or marines, or their legal representatives, in certain cases.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the proper accounting-officers of the Treasury be, and they are hereby, authorized and directed to settle the claims for pay, bounty, prize-money or other moneys due to colored soldiers, sailors, or marines, or their legal representatives in cases in which, upon proper investigation by the War Department, it shall be established that they have failed to receive payment upon settlements heretofore made, and in which vouchers purporting to represent actual payment have been filed with the accounting-officers of the Treasury by the disbursing-officers of the late Bureau of Refugees, Freedmen, and Abandoned Lands.

SEC. 2. That the investigations for the purpose of determining the facts as to the non-receipt by any claimant of the money purporting, by vouchers filed with the accounting-officers of the Treasury, to have been paid to him or her, shall be made under the direction of the Secretary of War, and in each and every case in which the investigation shall prove to his satisfaction that the claimant or claimants have not in fact received payment of their claims, he shall so report to the accounting-officers of the Treasury, who will thereupon settle the claim or claims to which such report by the Secretary of War shall pertain.

SEC. 3. That said settlements shall be made in accordance with existing laws governing the original settlement of such claims, and shall be chargeable against the same appropriations as were the original settlements.

SEC. 4. That nothing herein contained shall be construed as relieving the Commissioner of the late Bureau of Refugees, Freedmen, and Abandoned Lands, or the officers or agents acting under him, of any responsibility or accountability which, under existing laws or regulations, attaches to him or them in connection with any claim or claims to which this law has reference.

SEC. 5. Such expenses as may be necessitated by the investigations hereinbefore provided for, shall be defrayed by the Secretary of War from the appropriation for the "collection and payment of bounties, &c.," for fiscal year ending June 30, 1877.

Respectfully submitted to the Secretary of War.

E. D. TOWNSEND,

Adjutant-General.

CONDITION OF THE UNION PACIFIC RAILROAD.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

REPORT OF ISAAC N. MORRIS,

ONE OF THE

Commissioners appointed to examine the unaccepted portions of the Union Pacific Railroad.

JUNE 3, 1876.—Referred to the Committee on the Pacific Railroad.

JUNE 20, 1876.—Ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., May 26, 1876.

SIR: In compliance with House resolution of yesterday, I have the honor to transmit herewith a copy of the report of Hon. Isaac N. Morris, made to the President of the United States, under date of 28th May, 1869, on the condition of the Union Pacific Railroad between Omaha and the summit of the Rocky Mountains.

I am, sir, very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

Hon. M. C. KERR,
Speaker of House of Representatives.

MAY 28, 1869.

Mr. PRESIDENT: On the 13th day of March last your Excellency tendered me an appointment as one of the commissioners "to examine and report to the President of the United States upon the road and telegraph line of the Union Pacific Railroad Company as contemplated and specified by an act to aid in the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean, and to secure the Government the use of the same for postal, military, and other purposes."

Accompanying your letter of appointment, was a communication of the Hon. J. D. Cox, Secretary of the Interior, in which he says :

In case you accept the appointment you will be guided in the discharge of your duties, as commissioner, by the instructions embodied in the report of a board convened to determine on a standard for construction of the Pacific Railroad, dated February 24, 1866, a copy of which is herewith transmitted.

From the tenor of these documents, I suppose that, in making my report, I am to look both to the law and to the standard of construction embodied in the proceedings of the board.

The fourth section of the charter of the company provides, among other things--

That whenever said company shall have completed forty consecutive miles of any portion of said railroad and telegraph line, ready for the service contemplated by this act, and supplied with all necessary drains, culverts, viaducts, crossings, sidings, bridges, turn-outs, watering-places, depots, equipments, furniture, and all other appurtenances of a first-class railroad, the rails, and all other iron used in the construction and equipment of said road to be of American manufacture, of the best quality, the President of the United States shall appoint three commissioners to examine the same, and report to him in relation thereto, and if it shall appear to him that forty consecutive miles of said railroad and telegraph line have been completed and equipped in all respects as required by this act, then, upon certificate of said commissioners to that effect, patents shall issue conveying the right and title to said lands to said company, on each side of the road as far as the same is completed, to the amount aforesaid ; and patents shall, in like manner, issue as each forty miles of said railroad and telegraph line are completed, upon certificate of said commissioners.

It will be seen by this provision that Congress contemplated and provided for the construction only of a "first-class railroad" "in all respects," though it failed to specify in every detail what should constitute a "first-class road."

It also provided that, until the commissioners reported that such a railroad had been constructed by the company, the lands granted in aid thereof should not be conveyed. The law is explicit on this point.

The fifth section of the charter is equally explicit that, "upon the certificate in writing of said commissioners of the completion and equipment of forty consecutive miles of railroad and telegraph line in accordance with this act," the "Secretary of the Treasury shall issue to said company bonds of the United States of \$1,000 each, payable in thirty years after date, bearing 6 per cent. interest. (said interest payable semi-annually,) which interest may be paid in United States Treasury notes, or any other money or currency which the United States have or shall declare lawful money and a legal tender, to the amount of sixteen of said bonds per mile for such section of forty miles." The said fifth section also provides that upon the issue and delivery of said bonds to the company they "shall *ipso facto* constitute a first mortgage on the whole line of the railroad and telegraph, together with the rolling-stock, fixtures, and property of every kind and description," and in consideration of which said bonds were only to be issued by the terms of the act, thus showing that Congress was careful that the railroad should not only be a "first-class" one, but the company was to have no bonds until a "first-class railroad" was built, and further not until their payment was secured. Hence I should regard myself as criminally negligent if I failed to "report," as you instruct me in your letter, upon the road and telegraph line of the Union Pacific Railroad Company as contemplated by said acts, "meaning the acts providing for its construction." The law is much broader and more comprehensive than the "standard of construction," and is of course the governing power. It admits of no compromise with its provisions.

The \$16,000 per mile provided for in the fourth section of the charter was changed by the eleventh section to \$16,000, \$32,000, and \$48,000

per mile for certain distances, in a manner so artful that no one on reading the law can tell what it means. Extraneous facts must be resorted to as the key to unlock it. A tabular statement which I shall insert in a subsequent part of my report will show the number of miles upon which \$48,000 was paid per mile, the number upon which \$32,000 was paid per mile, and the number upon which \$16,000 was paid per mile. It is a strange feature of the legislation that there should exist two provisions upon precisely the same point in the same law conflicting directly with each other, yet such is the fact. I have not been able to find any change in any act I have examined more favorable to the Government, but numerous ones more favorable to the companies. Whether this was wise can be more readily determined by the facts disclosed in the sequel.

In view of the omission in the charter to specify all the details of construction, the Hon. James Harlan, then Secretary of the Interior, convened a board of Government commissioners, directors, and an engineer to determine on a standard for the Pacific Railroad and branches. It is, perhaps, better, with a view to a more intelligent understanding of the subject, to quote such material parts of the requirements fixed upon by the board as bear more directly upon that part of the road which I was charged with the duty of examining in part.

EMBANKMENTS AND EXCAVATIONS

In all parts of the main line of road or branches embankments should not be less than fourteen feet wide at the grade-line. Excavations, if the cuts are lengthy, should be 26 feet wide and in shorter cuts at least 24 feet, thus leaving in all cases room for continuous side ditches of ample depth and width, so as to secure that most essential requisite, a well-drained road-bed. Rock excavations should not be less than 16 feet wide, and all tunnels should be excavated for a double track. Slopes of earth embankments should be one and a half base to one rise. Excavations, except in rock, should have slopes from one to one and a half base to one rise, depending upon the material: or, if steeper, then to have increased width at grade, so as to remove the same quantity of earth contained within the slope.

MECHANICAL STRUCTURES.

Culverts and abutments for bridges and drains should be of stone, whenever a durable article can be obtained within a reasonable distance, say from five to eight miles, depending upon circumstances; provided that temporary trestles may be adopted upon assurance, to the satisfaction of the commissioners, that stone abutments will be substituted immediately after the line shall be opened so that stone can be transported thereon; but if good stone be too remote, then hard-burned brick or wooden trestle-work may be adopted. The wood to be of the most durable character the country will afford, and the wood or brick to be replaced by stone when that material can be conveyed conveniently by rail. Bridges of stone, or iron, or wood, (such as the Howe truss, or other equally good structure,) should be used at the discretion of the company.

BALLASTING.

A railroad cannot be considered complete until it is well ballasted. If composed of gravel or broken stone, it should be from 12 to 24 inches thick, depending on the lower material. In view of the settling of new embankments, which require time and rains before ballasting can be properly placed, and also in view of the number of miles required by law to be constructed annually, the perfect finish of the road-bed in this respect must be progressive, and the work of time. Yet it is the opinion of the board that such work of perfecting the ballast must proceed as usual on first-class railroads; otherwise subsequent sections should not be accepted, because the whole work is not then being carried forward as a great Pacific railroad, such as the law contemplates.

CROSS-TIES.

Oak or other suitable timber should be used, where it can be obtained with reasonable transportation. When such timber cannot be had for all the ties at reasonable cost, then the best the country affords may be adopted; but if it be cottonwood or similar soft material, it must be burnettized or kyanized thoroughly, so as to increase its durability. But in all cases the joint-tie should be of oak, or other suitable timber, the better to hold the

spikes at these points. There should be at least 2,400 ties to the mile. They should be eight feet long, six inches thick, and, if hewn, six inches on the face. If sawed, they should not be less than eight inches wide and not less than 2,400 per mile, or such number as will have the same bearing-surface, provided that, if any sawed ties have been already delivered or contracted for only seven inches wide, they may be laid down.

Whether the standard fixed upon by the board is a matter which a commissioner is allowed to look into may be regarded as problematical. But I cannot refrain from saying it seems strange that the board should designate what materials it was necessary to use in the construction of a "first-class railroad in all respects," and then concede that if the company could not obtain such materials conveniently, inferior articles might be used. The law makes no such concession, and if it had, it never could have been passed. It is stated, for example, that culverts and abutments for bridges should be of "stone," without specifying what kind of stone should be used, except to add the vague term "desirable article," (indefinite, to be sure,) "when it can be obtained within a reasonable distance, say from five to eight miles." Again, it is stated that oak or other suitable timber should be used for cross-ties, "where it can be obtained within reasonable transportation." What would be "reasonable transportation" is not defined, nor have the commissioners any jurisdiction over the question. They can only report on the materials used, and the condition of the road, and then the law determines whether the road has been built in compliance with its provisions.

Taking, however, the "law" and "standard" fixed upon by the board, vague and indefinite though the latter is, as a guide, the question arises whether that part of the Union Pacific Railroad which the present commissioners were charged with the duty of examining is constructed and equipped as the "law" and "standard" require.

The whole length of the road is given at 1,086 miles, or within a fraction of a mile of that, and is so stated in round numbers, extending from Omaha to the eastern summit of the Promontory range of mountains, which is, in fact, but one of the outposts of the Rocky Mountains. That part of it which the present commissioners were directed to examine commences a short distance west of Echo, on the Wasatch range, which is situated twenty-six miles west of the summit of the Wasatch mountains. There is at this initial point, so to speak, a tree upon which is a sign-board designating the distance to Omaha at 1,086 miles. It stands between the road-bed and the Echo River, which empties, a few miles below, into the Weber, and is about twenty feet from each. From this point to the eastern summit of the Promontory range is eighty-six miles, or four sections of twenty miles each, and a fractional section of five miles and eight-tenths of a mile. For descriptive purposes it is best to divide this portion of the road into three parts:

First. From the Thousand-Mile tree to where it enters the valley of Salt Lake, a distance of twenty-three miles.

Second. From the valley of Salt Lake, a distance of fifty-three miles and eight-tenths of a mile, to the base of the Promontory Mountain.

Third. From the base of the Promontory range to the summit, a distance in round numbers of nine miles.

These distances were furnished me by General M. F. Hurd, of Grinnell, Iowa, one of the engineers engaged upon the work, and to whom I am indebted also for other valuable information.

I passed over the four sections and the six-twentieths of a section twice, and a part of it four times, on a special car kindly furnished by the company and placed in charge of Chief Assistant Engineer Jacob House, occupying a seat on the rear platform of the car, with memo-

random-book in hand, causing it to move slowly, and stop at points where I desired to examine the road-bed, ties, cuts, &c. Perhaps it is best I should commence a description of the road at the eastern Promontory summit, where the "last spike," a golden one, was driven, and where it joins the Central Pacific. This summit is a considerable plateau, covered with artemisia, and quietly resting between two mountain combs or crests. Some thirty tents and a few board sheds mark the spot. The trader had reached it with his wares as soon as the road itself. It is a lonely and desolate locality, without water or fuel, both of which have to be brought from a distance, and Promontory City, as it is called, is not likely to become a commercial emporium, while it will have some fame and a romantic interest attached to it as the place where the Atlantic and Pacific first embraced. No railroad buildings have been erected there, except one or two mere sheds for the storage of baggage and the use of the telegraph, nor, indeed, are there any buildings on the line of the road from that point to the Thousand-Mile tree, such as the law requires. Two or three small ones are to be found on the route, one at Corinne, and one at Taylor's Mill, three miles east of Ogden, which are used for boarding and lodging the hands and for other road purposes. Taylor's Mill is the principal stopping-place for Salt Lake City, and unless the railroad from that city to Ogden, which the Mormons contemplate building, dispenses with the necessity of erecting a large depot and other buildings at that place, and shall require them at the point where the Salt Lake road shall cross the main track of the Union Pacific, there is certainly no place on the whole line of the road where they are so much required. Evidently the first and, it may be said, natural object of the company was to extend the line of its road without regard to much, if anything, else than what was indispensable to the necessities arising out of its construction. Five hundred and thirty miles, as I was informed, were built within the past year, and, to repeat the idea just expressed, the whole road was pushed forward in too much of a hurry, both in regard to economy and durability. There was a temptation to do this offered by subsidies and lands too great for poor, avaricious human nature to resist, and it was done in direct violation of the standard of construction agreed upon by the board, who state in their report that "the arguments in favor of a speedy construction must be subordinate to the substantial objects of the road, and the Government must be certain to have a work that will convey her mails, troops, and munitions of war, and the commerce of the country with entire celerity and convenience. It is the aim of this board to secure all these objects, and it is also our belief that they are not incompatible, it being only necessary on the part of the Government to insist on the reasonable requirements embodied in this report to hasten the completion of the great work, and at the same time to adapt it to the high public interest which it was intended to subserve."

The great error was in allowing two companies to build the road, one on the Pacific slope and one on this side, without Congress having fixed the point at which they should meet. The grants of lands and Government subsidies were erroneous, and whichever company built the most miles of road would receive the most of each. Hence there was an emulation arising from a consideration of pecuniary advantage, which stimulated each to almost superhuman effort, and finally culminated in an open rupture, requiring congressional intervention. Gangs of men were worked day and night, and on the Sabbath the same as any other day. Time was too precious to incur delay in procuring the best material or performing the work in the best manner. The great primary

object of the companies was money, and this fact is patent from what I have just stated, and must be made more manifest by time. The road, by the charter, was to be completed by the first day of July, 1876, but its completion is announced in May, 1869! This may be American enterprise, or it may be American recklessness.

That a railroad connecting the Atlantic with the Pacific States is a great desideratum no one will question. But that road should be as good as any, if not the best, in the world. Congress, as has been shown, intended it should be so, or otherwise that body would not have endowed it so liberally. Its object was one of patriotism, to establish a great commercial and social highway between the two sections of the Union. The object of the builders was, of course, profit. I suppose it is my duty to speak of the road as I saw it, and not as it may in the future be made—by whom is another question. A person traveling over it to or from the Pacific Ocean, transported with the idea that he can now make a journey in a few days which heretofore required from four to six weeks, knows but little more than this of the work.

From Promontory Summit to the foot of Promontory Mountain.—The road from Promontory Summit to the foot of the mountain is the most difficult of construction, except the tunnels, of any part I examined.

For a mile and a half the ties, it is true, are virtually laid on the ground, but the road then passes through several sand-banks, some comparatively small and some of formidable proportions, with intervening spaces of nearly level surface; thence it passes through rock excavations, one being some forty feet deep and a quarter of a mile long through the heaviest body of the mountain, overlooking Salt Lake; thence it sweeps around the mountain's side to its base, describing in its course a succession of short curves, so sharp indeed that an ascending and descending train would collide before either would be aware of the proximity of the other. I measured the width of the cuts, and found them so nearly in compliance with the standard of construction that they may be so regarded. The banks on either side I regard as reasonably safe. Before reaching the descending curve running on the side of the mountain, two dells or ravines are crossed on trestle-work, one, as nearly as I could judge, (for the atmosphere is so light in that latitude that distance is very deceptive to one not accustomed to it,) about two hundred and fifty feet long and from seventy to eighty feet deep; the other, about one hundred feet long and thirty feet deep. These trestle-structures, unknown to the law, but familiar to the line of road, and one over Blue Creek, not far distant, are very frail and dangerous. It is the purpose of the company, I was told, to fill up these ravines so as to have a solid road bed over them. The sooner this is done the better for the safety of lives and property. The grade was said to be eighty feet to the mile, but it must be much greater than this a part of the way. The grade of the Central Pacific down this mountain, partly finished, is still greater, and its curves sharper. The engineers evidently did not agree in their surveys. The rails laid on this grade being the same as those used in the valley, 56 pounds to the linear yard, are evidently too light; nor are the ties large enough to insure safety. A heavy train, should it run off the track when going at reasonable speed, would certainly crush them.

The road in the valley of Salt Lake.—There is so much sameness in this portion of the work that it is hard to distinguish between the different parts. It passes over a uniform valley, with the exception of a small clay cutting east of Taylor's Mill, with a surface as even as will generally be found on what we call a level plain. Indeed, it is rare that a

distance of fifty-three and eight-tenths miles is subject to so few depressions and elevations. The grade varies from an even surface to 2 or 3 feet, and the road-bed was constructed almost entirely with plows and scrapers. Its shaggy and unpolished appearance does not indicate that it was ever familiar with any other than rude implements. While this does not detract from its usefulness, it does from its cheerfulness, and indicates an inexcusable slovenliness and want of finish. I examined a piece of the road-bed constructed in this valley by the Central Pacific Company, and found it of a uniform width of 14 feet, and neatly finished.

The Union Pacific road-bed is neither of these. Its width at the grade-line on embankments, especially where it should be the widest, if any difference existed, is only the width of the tie, or 8 feet, sometimes a little over and sometimes a little under. In several places I saw the ends of the ties projecting over the embankment. What is here said of the road-bed in the valley will apply equally to that part of it lying east which I examined. Its composition is a mixture of dirt and sand, sometimes sand with comparatively few small gravel, and occasionally sand alone. Again, places are found where it is mostly dirt, and then portions are met which are chiefly, if not entirely, of gravel. Near the northern extremity of Salt Lake the mud-flats, as they are called by railroad men, are crossed. My impression when I saw them was that they were sand deposits. The lake has, evidently, once been over them, and, indeed, at one or two points now stretches its saline waters so far toward the mountains that they have to be crossed by trestle-work. It is a remarkable phenomenon of Salt Lake, which is surrounded by a rim of mountains and has no known outlet, that it has risen $9\frac{1}{2}$ feet in the last four years, and is still gradually rising. It has evidently one day been a bed of water of much greater depth than it is now, and I heard the opinion expressed that serious apprehensions were entertained that it is again gradually approaching its original elevation. Should it continue to rise—of which no man knows or can know anything with certainty, the mysterious laws operating upon it being a sealed book—it will not be long until the road-bed in the valley will be interfered with, and possibly, in time, may be entirely submerged.

The region extending from the base of Promontory Mountains to Ogden is strongly impregnated with alkali, as are other sections, and a slight rain makes it very muddy. It is needless to add that ties laid upon such ground would easily work loose after exposure to water, unless firmly ballasted with stone.

There are about sixteen culverts in the valley. As I saw them at a dry time I am not able to estimate how many cubic feet of water passes through each per minute after a copious rain; of course, some more and some less. These culverts, with two exceptions, which had sandstone abutments, are constructed of pine timber. Substantial stone abutments should be substituted as soon as possible. They are evidently required by public interest and the standard of construction. The two principal streams which make their way through the valley and empty their waters into Salt Lake, are Bear River and Ogden River. The first of these is infinitely the larger, and is rarely known to be less than eighteen feet deep, and when I crossed it was twenty-three; has a rapid current, and is a formidable stream. It is crossed by trestle-work, which must be regarded as frail and dangerous. A bridge is said to be contemplated, but nothing visible to me was done toward its erection. Ogden River is not formidable, and is crossed as other streams are.

The road from the eastern terminus of Salt Lake.—At the eastern termination of the valley, the road passes around a mountain-spur, the track cutting at its base first through a sand-bank, then a stone embedment, and passes up Weber River for a mile, where the waters of the stream describe a half circle through the mountain, and rush with great force down the chasm. This spot is so gloomy and dangerous that it has received the soubriquet of Devil's Gate. Here, for the first time in going east, the Weber is crossed, at a point ten miles from where it empties into Salt Lake. Timber for a bridge is being prepared, but no visible stone-work is being done. The bridge is to be 17 feet wide and 230 feet long. At present the stream is crossed on trestle-work 78 feet high, and is what may be termed a double trestle, one resting on the other. The main supporting-timbers stand at an angle of about 40 degrees gradually narrowing from the base to the top. The upper ones, among other means adopted to prevent their giving way, are secured by large ropes tied around them and fastened to projecting rocks above. The current being very rapid and the volume of water large, this structure is extremely dangerous. One of the chief mechanics, a young man by the name of Bowman, from Chicago, the day after I passed fell into the turbid waters, was swept away and drowned, it being impossible for any one to survive in such a current. I mention this to show that if a train should go down into this fearful gulf, all who escaped being crushed would, in all human probability, be drowned.

On my return the cars were detained twenty-four hours to have the trestles better secured by means of additional braces. They are now much safer, but far from being secure. An iron bridge at this point seems to me indispensable.

From Devil's Gate to the One Thousand-Mile tree is twenty-two miles in round numbers. Weber River is crossed five times in this distance, and some fifteen culverts are also found. In the mountains adjacent to this locality a red sandstone abounds, which has been used for abutments and piers. This sandstone can be had in large blocks or slabs at slight cost. Whether they will stand the action of water, frost, and the atmosphere is questionable. Those from the same quarry have a somewhat different solidity, but are evidently composed of the same elements, a calcareous substance doubtless being one of them. I procured four specimens, ranging from the hardest to the softest, which I transmit with my report for your excellency's inspection, and suggest their analysis. I carefully examined the abutments of two culverts at Morgan City, and found that a part of the blocks in them was rapidly decomposing; others lying on the ground were crumbling to pieces—seemed, indeed, quite rotten. Yet these stones were only obtained from the beds during last winter. It will require time to determine whether any of them will answer the purpose for which they are used. I am satisfied they will not long bear a great pressure—certainly not greater than good brick; still, if they do not break or decompose, they may answer for abutments and piers where a large body of them are together. I use the word "may," but my belief is they will prove an entire failure. Although of a different consistency they belong to the same family and all have the same doubtful character. Safety and permanency require that a more substantial and durable article should be used. I saw another stone at Green River, (not within the line of the road I was charged with examining, yet I cannot refrain from mentioning the fact,) of a grayish color, which appeared to be, and is indeed, very hard, and can be obtained in large blocks. This stone was used to fill up the treacherous log cribs sunk in the river, upon which a temporary bridge, so

called, rested. It has been ascertained, however, as I was informed by a gentleman in charge of that division of the road, that it contained soda or other alkali substance, and the water disintegrated it. It has proven so entirely worthless that it will have to be abandoned. Whether such will prove to be the case with all the rock in the mountain-ranges remains to be tested. The day I reached Green River on my return, the eastern abutment had given way and the train could go no farther. Passengers crossed the so-called bridge on foot, and took another train. There is a green sandstone, which I saw used for two culverts, but it is evidently like the balance. It is clear to my mind that the mountain sandstone is wholly unreliable. Engineers, until they are tested, can tell little, if anything, more about their durability than any one else. They are a cheap and convenient material, easily obtained and worked. I am of the opinion that now, before permanent bridges are built, the subject should receive the most serious attention of the Government and railroad company, and I would be derelict in duty if I failed to direct your excellency's notice especially to the subject. Including the bridge at Devil's Gate, which should by all means be of iron, as I have before stated and desire again to impress, six are necessary over the Weber alone in the distance of a few miles.

One culvert, having sandstone abutments and situated west of Morgan City, had given way, and as a further evidence of the unreliability of such stone used upon the road, (for they are manifestly all alike,) I must introduce into my report as germane, an extract from a letter I received from a gentleman in high official position who traveled over the road with his family. The letter bears date April 26, 1869, and while it was intended for my eye alone, I think the Government is entitled to its benefit.

[Extract.]

We had one or two narrow escapes on the Union Pacific Railroad. A bridge over Bitter Creek, just east of Green River, built upon abutments of soft sandstone, crumbled away under our train, precipitating the engine, tender, and express-car into the creek, and the passenger-car, in which I was, was only saved by a stringer or beam of the bridge catching into the roof and holding it suspended over the brink. We had to crawl out the best we could. One passenger was killed and several more or less injured. The conductor and engineer both prudently walked over first and then signaled the fireman to run us across. The bridge as well as two others in the vicinity had been examined the day previous and pronounced unsafe, and the officers were notified of the fact. The unanimous opinion is that it was criminal to attempt to cross. The western portion of the road is dangerous.

The writer is correct. The portion of the road he refers to is the worst I ever traveled over, and decidedly dangerous.

It is as well to state in this connection as anywhere else, that a gentleman long and still identified with the road, and who passes over it daily in the discharge of his duty, stated that he never rode over the bridges, so called, without holding his breath and drawing a long one of relief after he got over; that he considered them, especially the one at Devil's Gate, as dangerous, and he would not ride across at all but to give confidence to the passengers.

My memorandum-book shows (I quote from it) that from Devil's Gate "the road crosses to the east side of the Weber, passes around the mountain-spur, in a short distance reaches a safe but narrow valley, passes through it, then runs along the base of the mountain for one and a half miles, again crosses Weber River on trestles; but abutments for bridge and pier are being built of red sandstone; here a valley is reached which extends for some distance; an embankment from six to ten feet high would be swept away if the river should rise, as do our eastern streams; at end of the valley the road passes directly along the margin

of the river, cuts through a few mountain points; thence still continues along the valley up the Weber on an embankment of an average height of about six feet for some ten miles; width of embankment at grade-line about eight feet; embankment composed of gravel, gravel and clay, and sand and clay; some points, where the valley is wide, the road is sufficiently distant from the river to be secure from freshets; at the end of this valley the road takes its way through an opening between the mountains, then passes through another small valley, diverges from Weber River, enters Echo Cañon, and passes up Echo River to the Thousand-Mile tree."

Two tunnels are passed through; one 750 and one 260 feet long. These tunnels are not arched. They are cut through a sandstone formation, and are only wide enough for a single track, not a double one, as the standard of construction requires. With this exception, I think them safe.

While I may be possibly somewhat at fault in the details I have given, I feel satisfied I am substantially correct. But however important or unimportant these details, they cannot affect the great truths I shall now state:

First. The road is not, as the law requires, a "first class road."

Second. It is not supplied with the necessary buildings.

Third. It has not safe and substantial bridges.

Fourth. The tunnels are not wide enough for a double track.

Fifth. The road-bed at the grade-line is not of a uniform width of 14 feet, nor has it been properly leveled nor the rails lined.

Sixth. Especially would it be extremely dangerous for heavy trains to pass over the western portion of the road.

Seventh. The ties have sunken in many instances, sometimes at one end and sometimes entirely, the dirt being washed from under them; this is more generally the case on embankments. Miles upon miles of them were laid during the winter while the frost was in the ground. The rails, consequently, have an uneven bearing, and in numerous instances are bent, and appear, as you look back upon them, like a succession of small waves. I saw, however, a number of men at several different points engaged in raising the ends of the ties, and packing dirt under them so as to level the track as far as that would do it.

Two considerations remain which I deem of more importance than others:

First. The road is not ballasted, nor is any part of it. True, hands have been, and are now, here and there employed in throwing a few shovels of such material as the road-bed is composed, taken in all cases from the sides of the embankments, where they exist, between the ties. But this, I submit, is no compliance with the provision under the head of "ballasting" established by the board convened to fix upon a standard of construction. I again refer to that provision to be found with others in a former part of this report.

It is certainly of the highest moment that the road through Salt Lake Valley, which passes mainly over an alkali land, should be well ballasted with stone, certainly not less than eighteen inches in thickness. I leave this branch of the subject without further comment. The facts speak for themselves too plainly to be misinterpreted.

Cross-ties.—Cross-ties are laid with great irregularity on the bed of the road. They appear, indeed, to have been pitched on, and the rails spiked to them wherever they fell, provided they did not fall too far apart. No attention appears to have been paid to regularity of distance between the ties, they varying from fifteen to twenty-six inches,

the distance at the ends being rarely uniform, and the space between them presenting most frequently a quadrilateral figure of equal sides and unequal ends. This may be just as well for safety, yet it shows great carelessness and want of order.

The material objection is, however, to the ties themselves. They are of soft white pine on the road I examined, as well as on the Central Pacific, the first being obtained from the neighboring mountains, the latter from the Sierra Nevada. I transmit with my report a specimen of each, which I obtained at Promontory Summit. The board which fixed the standard of construction says of cross-ties:

Oak or other suitable timber should be used where it can be obtained with reasonable transportation. When such timber cannot be had for all the ties at reasonable cost, then the best the country affords may be adopted; but if it be cottonwood or similar soft material it must be burnettized or kyanized thoroughly so as to increase its durability. But in all cases the joint-ties should be of oak or other suitable timber, the better to hold the spikes at these points.

The ties, as I have stated, are all white pine, there being none of oak or other desirable wood used at the joints, and none of them are burnettized or kyanized. Their average face, I should judge, from a number I measured, is about six and a half inches. Whether such ties were ever before used on any other road I am not advised. Cedar has been used; and while it lasts well in the ground, experience has shown it will not hold spikes. White pine will soon rot on the surface or in the ground; it is easily destroyed by heat or dampness, and is consequently affected by both the winter's snow and the summer's sun. Even in the dry latitude of Salt Lake it is not possible for it to last long.

Another important consideration in regard to pine ties is, will they hold the spike, and are they sufficiently heavy? I have no knowledge of such ties being used on roads crossing the Alleghanies, though the timber abounds on either hand along their lines. All road-beds have more or less flexibility, and when not properly ballasted the passage of trains must soon work both the tie and spike loose. They expect on the Pacific Road to make some twenty-five or thirty miles per hour. The New York Central, one of the best built and ballasted roads in the United States, as I have always understood, will bear no greater than an average speed of thirty miles per hour. The trains on the Pennsylvania Central Road run at about the same rate of speed as on the New York Central. This road is ballasted with broken stone small enough to pass through a two and a half inch ring, ten inches thick under the ties and eight between them. The ties are oak, laid close together, and one of them must be as heavy as four of those used on the Union Pacific Road. The Pennsylvania Central may be regarded as a "first-class" road.

While, after all, time may alone determine how long a pine tie will last or hold a spike, every one familiar with the softness of that wood will on the impulse exclaim, "It will not do." This will be the common judgment of the country, and I believe two years or less will demonstrate its correctness. There are, then, three objections to the ties, one being their liability to speedy rot; one the softness of the wood being so great it will not hold a spike; the other, they were neither burnettized nor kyanized according to the standard of construction.

The rails.—I had no opportunity of weighing a rail, but have no doubt but that they weigh fifty-six pounds to the yard. The iron is of American manufacture, and has the appearance of being a good article. The joints are braced by iron plates on each side of the rails, secured by four

bolts with heads and nuts, two on each side of the joint, the bolts, of course, passing through the plates and rails.

Grades and curves.—I do not regard it the duty of a commissioner to pass judgment on the engineering of the road. Should he undertake to do that it would require more labor than he could well perform. If the Government desires to ascertain whether "grades and curves have been settled upon principles of true economy and adaptation based upon scientific and careful investigation, having a due regard both to cost of construction and future working of the road," the only way to do it is to send out on the road a board of able engineers and give them ample time to perform the labor. A true profile of the road will show its windings to be frequent, on the western portion especially, and in instances great. Perhaps they might have been less.

Rolling-stock.—How many locomotive-engines and cars are attached to the road, I had no means of ascertaining. They are so scattered at different points that a commissioner could hardly obtain the information. As far as I could judge the road seemed to be fairly supplied with stock. I saw a number of freight-cars wrecked by the side of it; still a large number were left distributed at different points. As the local business of the road is small and must remain so for years in consequence of passing through an unpeopled country, I do not believe its business requires more freight-cars at present. More passenger-coaches and locomotives could be used to advantage, especially the former.

The telegraph.—The telegraph consists of a single wire stretched along the road, with temporary offices at the different stations, but answering the purpose for the present.

The road.—I met on Promontory Summit a leading citizen of California, who has from the first been prominently connected with the Central Pacific Road, and we traveled together for a number of miles. In our conversation he stated that the road (I understood him to mean the whole of it) was about two-thirds done, and that it would require from two to three years to finish and place it in good order, and that Congress should have retained one-third of the subsidies until it was finally completed. I concur in the views he expressed, except in this, that his estimate is low. It was provided in the charter for retaining in the Treasury from 15 to 25 per cent. of the bonds to insure the completion of the road, but this, like every other salutary provision enacted to protect the public interest, yielded to the power of the corporation.

Congress undertook to remedy this mistake by the passage of the resolution of April 10, 1869, which, among other things, provides :

That the President is hereby authorized and required to withhold from each of said companies an amount of subsidy bonds, authorized to be issued by the United States under said acts [meaning acts for the construction of the Pacific railroad] sufficient to insure the full completion as a first-class road of all sections of such road on which bonds have already been issued, or, in lieu of such bonds, he may receive as such security an equal amount of first-mortgage bonds of such company. And if it shall appear to the President that the amount of subsidy bonds yet to be issued to either of said companies is insufficient to insure the full completion of such road, he may make requisition upon such company for a sufficient amount of bonds already issued to said company, or, in his discretion, of their first-mortgage bonds, to secure the full completion of the same, and, in default of obtaining such security as in this section provided, the President may authorize and direct the Attorney-General to institute such suits and proceedings in behalf and in the name of the United States, in any court of the United States having jurisdiction, as shall be necessary or proper to compel the giving of such security, and thereby and in any manner to protect the interest of the United States in said road, and to insure the full completion thereof as a first class road, as required by law and the statutes in that case made.

I submit whether this resolution will answer the purpose for which it was intended. Is not the effort one to lock the door after the loss has

been sustained? General Warren estimates it will yet require an expenditure of \$11,000,000 to perfect the roads, and even on this basis there are only about a third enough of undelivered bonds to effect the purpose. These bonds are claimed to be due for work recently executed, and altogether are not more than enough to pay the interest advanced by the Government for the companies, from whom nothing can be gained by engaging in a system of barter as proposed by the resolution. Why should the companies want the Government bonds in lieu of their own, unless they were to gain by the exchange? The proposition is a remarkable one.

If the roads are sold under a decree of foreclosure and should not bring enough, as they would not, to realize the par value of the bonds, there would of course be a loss on them. They are not even now worth in greenbacks but about ninety cents on the dollar, and when the Government bonds are paid out and these bonds taken in their place it is an acknowledgment of one of two things—either that the bonds of the railroads are intrinsically worth more than the Government bonds, or that Congress has made a present to the companies of the difference in favor of the Government bonds, and incurred a liability to pay interest besides.

The Attorney-General is powerless in the premises. He has no authority to force the companies to return bonds which have been paid to them, and it is not at all likely that they will stand in much fear of him. There is, however, a remedy for the Government which will be subsequently pointed out.

There is a vast difference between getting rails down so that cars can pass over them, and finishing a road. And as we are compelled to compete with European lines of transportation, the Pacific road never should have been used until it was completely finished; for a partly finished road, if put into use, acquires a reputation which it will require years to correct. So much has been said and so much written about the condition of this road that the very contradictions have deprived it of even what credit it is entitled to. We must have a road to the Pacific, and this road should be perfected. It passes over a line of country for one thousand and eighty-six miles, as far as I traveled on it, which for feasibility of construction, considering its length, is unequalled in the world. But very few formidable obstacles intervene. Plain after plain, valley after valley, plateau after plateau, open upon the eye as the cars speed along, and while one will see towering masses of rocks at a distance on the Black Hills, he will see very slight cuts through them. Then, again, when the Wasatch Mountains are reached, they do not, like the Alleghanies, present in the main one unbroken mass, but valleys open between them, and these valleys are always reached and descended by following the easy grade of some stream. I doubt if there are twenty-five miles of anything like heavy cutting in the whole distance. It is almost one continuous natural road-bed.

The facts which I have just stated, and others which I have presented in a former part of my report, demanded of the company a "first-class road in all respects." I will, however, state others bearing on the same point, premising what I shall add with the remark that the Government should keep its faith with the company and require the company to keep faith with it. If promises are to be taken on trust, let it be those of the Government, not those of the company.

The charter of the company provides that the Government bonds should be a first lien on the road, rolling-stock, &c.; that no more than every alternate section of land for ten miles on each side of the road should be given, and that payment of bonds should only be made when

forty miles were finished. No permission was conferred on the company to issue mortgage bonds at all. In this case, as in similar ones, the company went back to Congress, not to surrender any right they had acquired, for corporations never do that, but to ask additional grants and privileges. They asked that the Government bonds be made a second lien upon the road, and that they be allowed to issue mortgage bonds in amount equal to Government bonds, and that these mortgage bonds issued by themselves should be the first lien; that they should have every alternate section of land for twenty miles on each side of the road, instead of ten, and that they should receive bonds when each twenty miles of the road was done, instead of when each forty. The legislative body, unfortunately for the country, granted their request. The result will be a sale of the road on the company's mortgage bonds, which are a first lien, and the Government will get nothing unless it prevents itself being made a party to the proceedings, and thus forces a settlement or compromise, which, however, would amount to little or nothing in the end, for it would yield everything in the controversy.

Ten or fifteen millions of the company's mortgage bonds will fall into the hands of some one; how, can be imagined. The interest will not be paid; the bonds will be foreclosed, and who is to bid against the holder of them, representing, as he will, a powerful moneyed interest? No one. The Government cannot do it. If it owned the road ninety per cent. of its earnings would be stolen, and it would soon run down. No individual would have the means of doing it, and while the Government will lose the amount of her bonds, the holders of the major part of the mortgage bonds, who will not be shrewd capitalists, but unsuspecting widows and minors, will lose from 50 to 75 per cent. on their bonds, because they will only receive upon them a *pro rata* of what the road sells for. I am only writing here the experience and history of the past, and what interest prompts men to do. Whether the present company operate the road or not, (many believe it is not their purpose to do so,) the result will be substantially the same. The great object will be to get clear of the Government lien by foreclosure and sale under the mortgage bonds. This will be done unless the Government, as I have already suggested, refuses to allow itself to be made a party to the chancery proceedings, or unless the suggestions contained in the following paragraph are acted on. They are of the highest importance to the whole country.

The amendatory act of July 2, 1864, subordinates the Government lien, secured by the charter, to the mortgage bonds issued by the company. The twenty-second and last section of that act declares, "That Congress may at any time alter, amend, or repeal this act." The words "at any time" may perhaps be regarded as subject to some limitation. The courts might hold (I even doubt this) that this salutary protective clause would not apply after the completion of the road, or more certainly after its acceptance by the Government. Before that time there is no question, but it follows the mortgage bonds wherever they go. No matter in whose hands the bonds are found, the plea that they are held by innocent parties, so often interposed, cannot avail. The purchaser is bound to take notice of the law which constitutes a part of the condition of the bonds, as much so as if it were written upon their face. The road is not completed nor anything like it, and the power is yet in Congress to protect the Government. This should be done promptly and effectually. The Government bonds should be restored to a first lien, as they stood in the original charter, and the mortgage bonds of

the company should be made a second instead of a first lien. This done, all cavil and difficulty with the company will be at end. The Government has supplied means far more than sufficient to build the road, and why should it be given away? What moral or equitable right has any set of men to it? The money of the people built it.

The provisions in the amendatory act granting an extra quantity of land should also be repealed or suspended until the road is constructed as required by law. At least an opportunity should be offered for this legislation to transpire before another dollar is paid to the company.

While it cannot be regarded that Congress chose the most appropriate time to pass the resolution, approved April 10th last past, authorizing the President to appoint a commission of five to examine the whole road after the subsidies had been nearly all paid without any hope of their recovery, still that resolution must be regarded as an expression of Congress that it did not regard any part of the road as finally accepted. It may be that body was looking to the restoration of the Government lien by its action before it was precluded from doing so by lapse of time. The title of the resolution would seem to establish this conclusion. It is as follows:

Joint resolution for the protection of the interest of the United States in the Union Pacific Railroad Company, the Central Pacific Railroad Company, and for other purposes.

The "interest" of the Government is now attracting attention, and it is to be hoped that consideration will be sufficient to lift railroad matters out of the groove in which they have been running. Something for the people and not everything for corporations.

If the subsidies should be all paid and the lands conveyed now, the railroad companies would have no inducement to go on and finish their roads. On the contrary it would be for their interest to keep them only in possible running order, even if they intended to operate them in the future, until the sale is made on a portion of the mortgage bonds and the Government lien extinguished, for the reason that the worse condition that the road is in the less it will bring. The temptation to do this is too great to be resisted. Wiping out an incumbrance of some fifty-odd millions of dollars on the roads when it can be done by a short chancery proceeding is an advantage railroad gentlemen will not be slow to see and avail themselves of. The practice of Government and communities furnishing the means to build railroads and then allow those who take the contract to build them, for that is all it is, without investing a dollar of their private means, to own them after they are built, is not a very wise system of financiering on the one hand, but excessively shrewd on the other.

There is still another and more powerful argument why the railroad companies should be held to the strict letter of the contract and receive no more special favors. They are not released from the provision of the sixth section of the charter, which requires them to pay at maturity the principal and interest of the Government bonds; only from the provisions of the fifth section making the bonds a first lien. The following statement will show the amount of bonds issued on each mile of road, or to be issued:

UNION PACIFIC.

The eastern base of the Rocky Mountains was fixed at a point 525,166 miles west of Omaha.

525,166 miles, at \$16,000	\$8,401,248
150 miles, at \$13,000	7,200,000
324,166 miles, at \$32,000	10,397,504
1,000 miles	25,998,752

* From the 1,000-mile post to Promontory Summit, a distance of 86 miles, bonds have not been issued, neither has it been decided as to which company will be entitled to receive them. They would amount at \$32,000 per mile to....	\$2,752,000
	<u>28,750,752</u>

CENTRAL PACIFIC.

Western base of Sierra Nevada Mountains was fixed at a point 7¹/₁₀ miles west of Sacramento—

7 ¹ / ₁₀ miles, at \$16,000.....	\$114,820	
150 miles, at \$48,000.....	7,200,000	
512 ⁸ / ₁₀ miles, at \$32,000.....	16,410,240	
670 miles.....	\$28,750,752	
20 miles not reported on terminating at Promontory, at \$32,000..	640,000	
		<u>29,390,752</u>
1,776 miles, aggregating.....		53,115,872

The above account does not include \$6,303,000 of bonds issued to the Eastern Division of the Union Pacific, \$1,628,320 to Sioux City and Pacific, \$1,600,000 to Central Branch Union Pacific, and \$320,000 to Western Pacific, all issued under the same law, subject to the same conditions, and similar in effect. These bonds aggregate \$9,851,320. Add the amount to the \$53,115,872, and the result is \$62,967,192 as the amount of railroad bonds issued by the Government. The different companies to whom the bonds were issued now owe the Government \$3,334,963 for interest they should have paid on the bonds, but which the Government was compelled to pay for them to preserve its credit. From this, what may be expected in the future? If the company cannot now, with all the immense resources with which they have been supplied, pay the interest on the Government bonds, how can it hereafter pay interest on all the bonds?

I will not, however, run over in detail the whole question of finances as connected with the main road and branches. The Union Pacific is enough for illustrative purposes. The tabular statement given shows that the road has received or is to receive in Government bonds \$28,750,752. Its mortgage bonds amount to precisely the same, so that the whole bonded debt of the road is or will be \$57,401,504. Divide \$28,750,752 by 1,086, the length of the road, and it will show the average paid upon it per mile in Government bonds is \$26,473.98. This is, or should be, more than its actual cost. To illustrate, I will state that General M. F. Hurd, of Grinnell, Iowa, one of the engineers engaged on the work, informed me that it cost \$3,000 per mile on an average (it would not cost over \$1,500 in the States) to grade the road in Salt Lake Valley for fifty-three and eight-tenths miles; that the average cost of the ties was ninety cents apiece, or \$2,340 for twenty-six hundred, the number used per mile; that the iron cost on the ground \$100 per ton; that a hundred tons were used per mile, costing \$10,000, and that it cost \$600 per mile to lay the track. Add these several sums together, and they give \$15,940 per mile as the actual cost, while the company receives \$32,000 per mile from the Government. The \$15,940 does not include an allowance for rolling-stock, telegraph, &c., but deduct \$6,000 per mile for this purpose, and there remains \$9,940 per mile. Still add to this the mortgage bonds for \$32,000 per mile, first deducting

* It has often been asserted that the Union Pacific Railroad is not 1,086 miles long. I know nothing of the truth of this; the Government, however, should have all the roads upon which it has issued bonds measured.

\$6,000 per mile to be expended for telegraph, rolling-stock, &c., making the whole allowance to be used for such purpose \$12,000 per mile, and add the remainder, \$26,000 per mile and the \$9,940 together, and it will show a surplus of \$35,940 per mile above the cost of the road. This result will enable a man of ordinary intelligence to determine whether the members of the company paid anything out of their own pockets to build it. But take the average per mile for the whole distance of 1,086 miles furnished in Government bonds, to wit, \$26,473.98, and who doubts but this of itself should be sufficient to build and equip the road and construct a line of telegraph; and there is still left \$32,000 per mile in mortgage-bonds in the hands of the company, making in all \$34,752,000 for the whole length of the road—1,086 miles. The figures are drawn from experience and reason. The exact amount made by the company will never be known, for it will never be to its advantage that it should be. The company received, besides the bonds from the Government, every alternate section of land on each side of the road for twenty miles, aggregating for the 1,086 miles, if it followed a direct line, (as it does not it will be somewhat less,) 13,900,800 acres, or 12,800 acres per mile, which, at three dollars per acre, amounts to \$41,702,400. Add this amount to the \$34,752,000 of bonds, and we have a sum total of \$75,454,400—enough to make seventy-five individual millionaires. But throw half of this away, and you have nearly thirty-eight millions of profit left for distribution among a few men, to say nothing of capital stock. I am satisfied my estimate is low.

Divide \$53,115,872, the whole amount of Government bonded debt on the two roads, by 1,776, the number of miles from Omaha to Sacramento, and it gives \$29,907.58 as the average Government subsidy per mile. Add to this the same amount for mortgage-bonds, and it will show the whole average bonded debt of the road to be \$59,815.16 per mile, or \$106,231,744 in all, upon which the Government has only a second lien on half the amount—\$53,115,872. Upon the main road and branches, inclusive, it has a second lien for \$62,967,192, furnished in bonds bearing 6 per cent. interest. It is an easy thing to create a public debt, but not so easy to pay it out of the labor of the producing classes, who have to pay all public debts, and not the millionaire.

The Union Pacific (I know nothing of the Central Pacific in this regard) has provided for issuing \$100,000,000 of capital stock, and has actually issued about \$25,000,000. This stock has been selling in the market heretofore at seventy-five to eighty cents on the dollar. How much it is worth now I am not advised. How much it will be worth when it is not held by those who hold the controlling power over the road, intelligent men can judge.

RECAPITULATION.

Railroad companies to the people, DR.

- For \$53,115,872 of Government bonds.
- For 53,115,872 of mortgage-bonds.
- For 3,334,962 interest paid for their use.
- For 60,477,056 for 23,492,352 acres public land.
- For 100,000,000, amount of capital stock authorized to be issued on the above basis, about twenty or twenty-five per cent. of which is in the hands of the public.
- For _____, income of said roads.
- For the railroads themselves, the rolling-stock, and property of every nature and kind connected therewith.

The people to the railroad companies, DR.

- For the privilege of riding over said roads by paying for it.

The amount realized for the capital stock, whether twenty-five, fifty, or one hundred millions, is so much additional gain to the company.

So the companies have the bonds, \$106,231,744; the benefits of \$3,334,962 interest paid for them by the Government; the capital stock, amounting to, as above stated, \$100,000,000; the lands, \$60,477,056, proceeds of 23,492,352 acres, and own the road and all the property connected with it besides. This is what is called in this country the enterprise of capital and its investment for the public good. It may be a misnomer.

If Congress made a bad bargain, I am not for repudiating it. I think, however, the Government should protect its interests by availing itself of all reserved rights and insisting upon a rigid compliance on the part of the companies with their engagements before anything more is paid or the lands patented. There is certainly nothing wrong in this. The right to pass over the roads, such as they are, by paying for it, is all the people will get for the enormous amount they have been compelled to contribute for their construction, and they are certainly entitled to have a "first-class road in all respects," that they may be assured of life and limb. Unusual care should be taken in operating this road as well as in constructing it, for if a serious calamity should happen to a passenger train it would be almost impossible to obtain medical aid and proper shelter for the wounded, so sparsely is the country settled.

I will add, in conclusion, that on my return to Omaha, I was shown a prepared report, gotten up by an officer of the company, on the first section of twenty miles of the road west of the last accepted section, setting forth it was constructed in strict compliance with law, and was told that other similar reports for the remaining sections were in progress of preparation; that such was the accustomed way for reports to be prepared for the commissioners, and then they signed them. Not being satisfied that I could, without violation of duty, adopt the usual form and sign such a paper, I have prepared this report for myself, as expressive of my own views.

PERSONAL.

I regret being compelled to go over the road without my associates, in consequence of a misunderstanding of the time the commission was to meet at Omaha, growing out of an unexpected delay in instructions. I should have been highly gratified to have accompanied General Warren and Hon. James F. Wilson. As that pleasure was denied me, I was obliged to perform my duty by making the necessary examination alone. Not even the privilege of consulting either of these gentlemen before this report was prepared was afforded me. I therefore submit it for myself.

Most respectfully,

ISAAC N. MORRIS,
Commissioner.

His Excellency U. S. GRANT,
President of the United States.



WILLIAM WEBSTER.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RESPONSE TO

A resolution of the House of Representatives, adopted on July 1, 1876, in relation to the sequestration by the government of Great Britain of the property of an American citizen in New Zealand.

JULY 13, 1876.—Referred to the Committee on Foreign Affairs and ordered to be printed.

To the House of Representatives :

I transmit herewith, in answer to a resolution of the House of Representatives, of the 1st ultimo, a report from the Secretary of State upon the subject.

U. S. GRANT.

WASHINGTON, July 13, 1876.

DEPARTMENT OF STATE,
Washington, July 13, 1876.

The Secretary of State has the honor to report, that upon the 2d day of June he received a copy of a resolution of the House of Representatives in the following words :

“Resolved, That the Secretary of State be directed, if not inconsistent with the public service, to furnish to the House copies of the correspondence between the State Department and the government of Great Britain, in relation to the sequestration of the lands and property in New Zealand claimed by William Webster, an American citizen, by purchase of the native chiefs of that country by Webster before its cession to and occupation by the British government.”

No correspondence has taken place between the Department of State and the government of Great Britain in relation to the sequestration of the lands and property in New Zealand claimed by William Webster, an American citizen. In the years 1841 to 1844 certain correspondence was had between the legation in London and the foreign office of Great

Britain in reference to the general question of land-titles held in New Zealand by American citizens, but no correspondence has taken place in regard to the particular claim of Mr. Webster.

Respectfully submitted.

HAMILTON FISH.

To the PRESIDENT.

○

NELSON TIFFANY.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

ASSIGNING REASONS FOR

Withholding his approval of bill H. R. 1337.

JULY 12, 1876.—Referred to the Committee on Military Affairs and ordered to be printed.

To the House of Representatives:

For the reasons set forth in the accompanying report of the Secretary of War, I have the honor to return herewith without my approval House bill No. 1337, entitled "An act for the relief of Nelson Tiffany."

U. S. GRANT.

EXECUTIVE MANSION, July 11, 1876.

WAR DEPARTMENT,
Washington City, June 7, 1876.

SIR: I have the honor to return House bill 1337, "for the relief of Nelson Tiffany."

The Adjutant-General, to whom the bill was referred, reports as follows:

"Nelson Tiffany, private Company A, Twenty-fifth Massachusetts Volunteers, deserted October 10, 1864, and remained absent until April 25, 1865, when he surrendered under the President's proclamation, thereby acknowledging his desertion.

"If this bill becomes a law it will not only falsify the records of this Department, but will be an injustice to every man who served honorably during the war of the rebellion."

I inclose the report (No. 402) of the Senate Committee on Military Affairs in the case.

Very respectfully, your obedient servant,

J. D. CAMERON,
Secretary of War.

To the PRESIDENT.

[H. R. 1337. Forty-fourth Congress, first session.]

In the Senate of the United States May 1, 1876.—Read twice and referred to the Committee on Military Affairs.

An Act for the relief of Nelson Tiffany.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is hereby authorized and directed to remove the charge of desertion from Nelson Tiffany, late a private in Company H, Twenty-fifth Massachusetts Volunteers, and grant said Tiffany an honorable discharge.

Passed the House of Representatives April 29, 1876.

Attest:

GEORGE M. ADAMS,
Clerk.

[Senate report No. 402. Forty-fourth Congress, first session.]

JUNE 20, 1876.—Ordered to be printed.

Mr. CLAYTON submitted the following report, to accompany bill H. R. 1337.

The Committee on Military Affairs, having under consideration the bill (H. R. 1337) for the relief of Nelson Tiffany, submit the following report:

We find that Nelson Tiffany was enlisted in Company A, Twenty-fifth Massachusetts Volunteers, on the 16th September, 1861, and was honorably discharged on May 15, 1865. He was severely wounded on May 9, 1864, and was sent to hospital at Bermuda Hundreds, from thence to Fortress Monroe, and finally to hospital at New Haven, Conn., from which place he received a furlough from June 17 for thirty days, which was extended to August 7, 1864, and at its expiration he reported to medical director at Boston, and by him sent to Readville, Mass., on 10th October, being directed to report back to New Haven, Conn. He being in a worn-out and broken-down condition from wounds and sickness, believed he would never recover. He returned to his home at Auburn, Mass., and then reported to the provost-marshal at Worcester, Mass., and was by him sent to Fort Independence, and there remained till his discharge, on May 15, 1865. The records show that Tiffany was a faithful soldier, and he is believed now to be upon his death-bed from wounds received in the war. The committee believe, from all the evidence in the case, that Nelson Tiffany never intended to desert, and they recommend the passage of the accompanying bill.

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ELIZA JANE BLUMER.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

ASSIGNING

Reasons for not approving H. R. 11.

JULY 13, 1876.—Referred to the Committee on Invalid Pensions and ordered to be printed.

To the House of Representatives :

For the reasons stated in the accompanying report by the Commissioner of Pensions to the Secretary of the Interior, I have the honor to return without my approval House bill No. 11, entitled "An act granting a pension to Eliza Jane Blumer."

U. S. GRANT.

EXECUTIVE MANSION, *July 13, 1876.*

DEPARTMENT OF THE INTERIOR,
Washington, July 8, 1876.

SIR: I have the honor to return herewith a bill (H. R. 11) entitled "An act granting a pension to Eliza Jane Blumer," and to invite your attention to the inclosed copy of a communication addressed to me on the 7th instant by the Commissioner of Pensions relating to said bill.

In the opinion of this Department the misdescription of the soldier in the bill is of such a character as would render it difficult, if not impossible, to carry the provisions of the bill into effect should it become a law.

I have the honor to be, with great respect, your obedient servant,
CHARLES T. GORHAM,
Acting Secretary.

The PRESIDENT.

DEPARTMENT OF THE INTERIOR, PENSION-OFFICE,
Washington, D. C., July 7, 1876.

SIR: I have the honor to return herewith engrossed House bill No. 11, giving to Eliza Jane Blumer a pension, as the widow of Henry A. Blumer

private of Company A, Forty-seventh Pennsylvania Volunteers, with the suggestion that, if the bill is intended to pension Eliza Blumer, whose application, No. 46382, on file in this Office, has been rejected, it should designate the soldier as of Company B, of said regiment, it failing to appear, from the records of the War Department, that he served in any other company than that last named.

I am, sir, very respectfully, your obedient servant,

J. A. BENTLEY,

Commissioner.

The Hon. the SECRETARY OF THE INTERIOR.

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MILITARY EXPEDITION AGAINST THE SIOUX INDIANS.

JULY 15, 1876.—Referred to the Committee on Military Affairs.

JULY 18, 1876.—Recommitted to the Committee on Military Affairs and ordered to be printed.

MILITARY EXPEDITION AGAINST THE INDIANS.

Mr. BANNING. I ask unanimous consent to submit for adoption now the following resolution :

Resolved, That the Secretary of War be, and he is hereby, directed to report to the House the object of the military expeditions under Generals Crook, Gibbon, and Terry, now operating against the Northwest Indians, and the circumstances leading to their necessity, with copies of all correspondence bearing upon the origin of the expedition ; also copies of all military orders issued by the War Department directing these expeditions under Generals Terry, Crook, and Gibbon.

WAR DEPARTMENT,
Washington City, July 14, 1876.

SIR : In response to a resolution of the House of Representatives of the 10th instant, I have the honor to send herewith to the Speaker a report and accompanying papers made to the President of the United States, showing the object of the present military operations against the Sioux and other Northwestern Indians, and the circumstances tending to the necessity of the operations.

The copies of papers accompanying give all the information on file as to the orders issued by the War Department directing these expeditions.

Very respectfully, your obedient servant,

J. D. CAMERON,
Secretary of War.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

COMMUNICATION, JULY 8, 1876, AND INCLOSURE, FROM SECRETARY OF WAR TO PRESIDENT UNITED STATES, IN RESPONSE TO SENATE RESOLUTION OF JULY 7, 1876.

Official :

E. D. TOWNSEND,
Adjutant-General.

ADJUTANT-GENERAL'S OFFICE,
Washington, July 15, 1876.

WAR DEPARTMENT,
Washington, July 8, 1876.

To the PRESIDENT :

To enable you to answer the inclosed resolution of the Senate of July 7, I have the honor to submit the following brief statement of facts as exhibited by the records of this Department :

The Sioux or Dakota Nation of Indians, embracing various tribes, as the Yanktons, Yancetonnais, Brulés, Ogallallas, Minneconjoux, Sans Arcs, Two Kettles, &c., have long been known as the most brave and warlike savages of this continent. They have for centuries been pushed westward by the advancing tide of civilization, till in 1868 an arrangement or treaty was made with them, by a special commission named by Congress, whereby for certain payments and stipulations they agreed to surrender their claim to all that vast region which lies west of the Missouri River and north of the Platte, to live at peace with their neighbors, and to restrict themselves to a territory bounded east by the Missouri River, south by Nebraska, west by the one hundred and fourth meridian, and north by the forty-sixth parallel, a territory as large as the State of Missouri. The terms of this treaty have been literally performed on the part of the United States, and have also been complied with by the great mass of the Sioux Indians. Some of these Indians, however, have never recognized the binding force of this treaty, but have always treated it with contempt; have continued to rove at pleasure, attacking scattered settlements in Nebraska, Wyoming, Montana, and Dakota, stealing horses and cattle, and murdering peaceful inhabitants and travelers.

On the 9th of November, 1875, United States Indian Inspector E. C. Watkins made an elaborate report to the Commissioner of Indian Affairs, in which he uses this language :

"I have the honor to address you in relation to the attitude and condition of certain wild and hostile bands of Sioux Indians in Dakota and Montana, that came under my observation during my recent tour through their country, and what I think should be the policy of the Government toward them. I refer to Sitting Bull's band, and other bands of the Sioux Nation under chiefs or head-men of less note, but no less untamable and hostile. These Indians occupy the center, so to speak, and roam over Western Dakota and Eastern Montana, including the rich valleys of the Yellowstone and Powder River, and make war on the Arickarees, Mandans, Gros Ventres, Assinaboines, Blackfeet, Piegons, Crows, and other friendly tribes on the circumference.

"From their central position they strike to the east, north, and west, steal horses and plunder from all the surrounding tribes as well as frontier settlers and luckless white hunters, or emigrants who are not in sufficient force to resist them."

After describing at great length their character and supposed numbers, given at a few hundred, he says : "The true policy, in my judgment, is to send troops against them in the winter, the sooner the better, and whip them into subjection. They richly merit punishment for their incessant warfare, and their numerous murders of white settlers and their families, or white men wherever found unarmed." The force estimated as necessary to whip them was one thousand men.

This communication was submitted by the Commissioner of Indian Affairs, Hon. Edward P. Smith, to the honorable Secretary of the Interior, Z. Chandler, who in turn submitted it to the then Secretary of War, General Belknap, for his "consideration and action."

In a subsequent communication of the Secretary of the Interior, of

December 3, 1875, to the Secretary of War, occurs this language: "I have the honor to inform you that I have this day directed the Commissioner of Indian Affairs to notify said Indians (Sitting Bull and others outside their reservation) that they must remove to the reservation before the 31st day of January, 1876; that if they neglect or refuse so to remove, that they will be reported to the War Department as hostile Indians, and that a military force will be sent to compel them to obey the orders of the Indian Office."

On the 1st day of February, the Secretary of the Interior further notified the Secretary of War, "The time given him (Sitting Bull) in which to return to an agency having expired, and the advices received at the Indian Office being to the effect that Sitting Bull still refuses to comply with the directions of the Commissioner, the said Indians are hereby turned over to the War Department for such action on the part of the Army as you may deem proper under the circumstances."

During all the stages of this correspondence, the General of the Army and his subordinate commanders were duly notified, and were making preparations for striking a blow at these hostile savages, an enterprise of almost insurmountable difficulty in a country where, in winter, the thermometer often falls to 40° below zero, and where it is impossible to procure food for man or beast. An expedition was fitted out under the personal command of Brig. Gen. George Crook, an officer of great merit and experience, which, in March last, marched from Forts Fetterman and Laramie to the Powder River and Yellowstone Valleys, struck and destroyed the village of Crazy Horse, one of the hostile bands referred to by Indian Inspector Watkins, but the weather was found so bitter cold, and other difficulties so great arose, that General Crook returned to Fort Laramie in a measure unsuccessful so far as the main purpose was concerned. These Indians occupy parts of the Departments of Dakota and Platte, commanded by Brigadier-Generals Terry and Crook, respectively, but the whole is immediately commanded by Lieutenant-General Sheridan, who has given the matter his special attention. Preparations were then made on a larger scale, and three columns were put in motion as early in May as possible: from Fort Abraham Lincoln on the Missouri River under General Terry; from Fort Ellis in Montana under General Gibbon; and from Fort Fetterman under General Crook. These columns were as strong as could be maintained in that inhospitable region, or could be spared from other pressing necessities, and their operations are not yet concluded nor is a more detailed report deemed necessary to explain the subject-matter of this inquiry.

The present military operations are not against the Sioux Nation at all, but against certain hostile parts of it which defy the Government, and are undertaken at the special request of that bureau of the Government charged with their supervision, and wholly to make the civilization of the remainder possible. No part of these operations is on or near the Sioux reservation. The accidental discovery of gold on the western border of the Sioux reservation, and the intrusion of our people thereon, have not caused this war, and have only complicated it by the uncertainty of numbers to be encountered. The young warriors love war and frequently escape their agents to go on the hunt or war-path, their only idea of the object of life. The object of these military expeditions was in the interest of the peaceful parts of the Sioux Nation, supposed to embrace at least nine-tenths of the whole, and not one of these peaceful or treaty Indians has been molested by the military authorities.

The recent reports touching the disaster which befell a part of the

Seventh Regular Cavalry, led by General Custer in person, are believed to be true. For some reason as yet unexplained, General Custer, who commanded the Seventh Cavalry, and had been detached by his commander, General Terry, at the mouth of Rosebud to make a wide detour up the Rosebud, a tributary to the Yellowstone, across to the Little Horn and down to the mouth of Big Horn, the place agreed on for meeting, attacked *en route* a large Indian village with only a part of his force, having himself detached the rest with a view to intercept the expected retreat of the savages, and experienced an utter annihilation of his immediate command. The force of Generals Terry and Gibbon reached the field of battle the next day, rescued fifty-two wounded men and buried two hundred and sixty-one dead men, including Lieut. Col. George A. Custer, Captains Custer, Keogh, Yates; Lieutenants Cook, Smith, McIntosh, Calhoun, Hodgson, Reilly, Porter, Sturgis, all of the Seventh Cavalry; and Lieutenant Crittenden, of the Twentieth Infantry, Lieutenant Harrington, Assistant Surgeon Lord, and Acting Assistant Surgeon De Wolff are missing.

The wounded were carried back to the mouth of the Big Horn in the Yellowstone River, which is navigable, and where there were two steamboats, one of which was sent down the river, to Fort Abe Lincoln, with the wounded and to communicate these sad facts.

General Terry is, therefore, at the mouth of the Big Horn refitting, and will promptly receive re-enforcements and supplies, and will resume his operations immediately.

Meantime General Crook had also advanced from Fort Fetterman, and on the 17th of June, eight days before General Custer's attack, had encountered this same force of warriors on the head of the Rosebud, with whom he fought several hours, driving the Indians from the field, losing nine men in killed; one officer and twenty men wounded. General Crook reports his camp as on Tongue River, Wyoming. Re-enforcements and supplies are also *en route* to him, and every possible means have been adopted to accomplish a concert of action between these two forces, which are necessarily separated, and are only able to communicate by immense distances around by their rear.

The task committed to the military authorities is one of unusual difficulty; has been anticipated for years, and must be met and accomplished. It can no longer be delayed, and everything will be done by the Department to insure success, which is necessary to give even an assurance of comparative safety to the important but scattered interests which have grown up in that remote and almost inaccessible portion of our national domain.

It is again earnestly recommended that the appropriation asked for repeatedly by General Sheridan, of \$200,000, be made, to build two posts on the Yellowstone at or near the mouths of the Big Horn and Tongue Rivers.

Inclosed herewith please find copies of General Terry's report, just received by telegraph, since the preparation of this letter.

Very respectfully, your obedient servant,

J. D. CAMERON,
Secretary of War.

[Copy telegram.]

CHICAGO, ILL., July 8, 1876.

TO ADJUTANT-GENERAL U. S. ARMY,
Washington, D. C. :

The following is a copy of General Terry's report of action of June 25th :

"CAMP ON LITTLE BIG HORN RIVER, *June 27.*

"TO ADJUTANT-GENERAL OF MILITARY
 "DIVISION OF THE MISSOURI,
"Chicago, Ill. :

"It is my painful duty to report that day before yesterday, the 25th instant, a great disaster overtook General Custer and the troops under his command. At 12 o'clock of the 22d he started with his whole regiment and a strong detachment of scouts and guides from the mouth of the Rosebud. Proceeding up that river about twenty miles he struck a very heavy Indian trail, which had previously been discovered, and pursuing it found that it led, as it was supposed that it would lead, to the Little Big Horn River. Here he found a village of almost unexampled extent and at once attacked it with that portion of his force which was immediately at hand. Major Reno, with three companies, A, G, and M, of the regiment, was sent into the valley of the stream at the point where the trail struck it. General Custer, with five companies, C, E, F, I, and L, attempted to enter it about three miles lower down. Reno forded the river, charged down its left bank, dismounted, and fought on foot until finally, completely overwhelmed by numbers, he was compelled to mount, recross the river, and seek a refuge on the high bluff which overlooked its right bank. Just as he recrossed, Captain Benteen, who, with three companies, D, H, and K, was some two miles to the left of Reno when the action commenced, but who had been ordered by General Custer to return, came to the river, and rightly concluding that it was useless for his force to attempt to renew the fight in valley, he joined Reno on the bluffs. Captain McDougall with his company (B) was at first at some distance in the rear with a train of pack-mules. He also came up to Reno. Soon this united force was nearly surrounded by Indians, many of whom, armed with rifles, occupied positions which commanded the ground held by the cavalry—ground from which there was no escape. Rifle-pits were dug, and the fight was maintained, though with heavy loss, from about half past 2 o'clock of the 25th till 6 o'clock of the 26th, when the Indians withdrew from the valley, taking with them their village. Of the movements of General Custer and the five companies under his immediate command, scarcely anything is known from those who witnessed them, for no officer or soldier who accompanied him has yet been found alive. His trail, from the point where Reno crossed the stream, passes along and in the rear of the crest of the bluffs on the right bank for nearly or quite three miles; then it comes down to the bank of the river, but at once diverges from it, as if he had unsuccessfully attempted to cross, then turns upon itself, almost completes a circle, and closes. It is marked by the remains of the officers and the bodies of his horses. Some of them dropped along the path; others heaped where halts appear to have been made. There is abundant evidence that a gallant resistance was offered by the troops, but they were beset on all sides by overpowering numbers. The officers known to be killed are General Custer, Captains Keogh, Yates, and Custer; Lieu-

tenants Cook, Smith, McIntosh, Calhoun, Porter, Hodgson, Sturgis, and Reilly, of the cavalry. Lieutenant Crittenden, of the Twentieth Infantry, and Acting Assistant Surgeon De Wolf, Lieutenant Harrington, of the cavalry, and Assistant Surgeon Lord are missing. Captain Benteen and Lieutenant Varnum of the cavalry are slightly wounded. Mr. Boston Custer, a brother, and Mr. Reed, a nephew, of General Custer, were with him, and were killed. No other officers than those whom I have named are among the killed, wounded, or missing. It is impossible as yet to obtain a reliable list of the enlisted men who were killed and wounded, but the number of killed, including officers, must reach two hundred and fifty. The number of wounded is fifty-one. At the mouth of the Rosebud, I informed General Custer that I should take the supply-steamer *Far West* up the Yellowstone to ferry General Gibbon's column over the river; that I should personally accompany that column, and that it would in all probability reach the mouth of the Little Big Horn on the 26th instant. The steamer reached General Gibbon's troops near the mouth of the Big Horn early in the morning of the 24th, and at 4 o'clock in the afternoon all his men and animals were across the Yellowstone. At 5 o'clock the column, consisting of five companies of the Seventh Infantry, four companies of the Second Cavalry, and a battery of three Gatling guns, marched out to and across Tullock's Creek, starting soon after 5 o'clock in the morning of the 25th. The infantry made a march of twenty-two miles over the most difficult country which I have ever seen. In order that scouts might be sent into the valley of the Little Big Horn, the cavalry with the battery was then pushed on thirteen or fourteen miles farther, reaching camp at midnight. The scouts were set out at half past four on the morning of the 26th. The scout discovered three Indians, who were at first supposed to be Sioux, but when overtaken they proved to be Crows who had been with General Custer. They brought the first intelligence of the battle. Their story was not credited. It was supposed that some fighting, perhaps severe fighting, had taken place, but it was not believed that disaster could have overtaken so large a force as twelve companies of cavalry. The infantry which had broken camp very early soon came up, and the whole column entered and moved up the valley of the Little Big Horn. During the afternoon efforts were made to send scouts through to what was supposed to be General Custer's position, and to obtain information of the condition of affairs; but those who were sent out were driven back by parties of Indians, who, in increasing numbers, were seen hovering in General Gibbon's front. At twenty minutes before 9 o'clock in the evening, the infantry had marched between twenty-nine and thirty miles; the men were very weary, and daylight was failing; the column was therefore halted for the night at a point about eleven miles in a straight line above the mouth of the stream. This morning the movement was resumed, and after a march of nine miles Major Reno's intrenched position was reached. The withdrawal of the Indians from around Reno's command and from the valley was undoubtedly caused by the appearance of General Gibbon's troops. Major Reno and Captain Benteen, both of whom are officers of great experience, accustomed to see large masses of mounted men, estimated the number of Indians engaged at not less than twenty-five hundred. Other officers think that the number was greater than this. The village in the valley was about three miles in length, and about a mile in width. Besides the lodges proper, a great number of temporary brushwood shelter was found in it, indicating that many men besides its proper inhabitants had gathered together there. Major Reno is very confident that there

were a number of white men fighting with the Indians. It is believed that the loss of the Indians was large. I have as yet received no official reports in regard to the battle, but what is stated herein is gathered from the officers who were on the ground there, and from those who have been over it since.

"ALFRED H. TERRY,
Brigadier-General."

R. C. DRUM,
Assistant Adjutant-General.

COPIES OF CORRESPONDENCE CALLED FOR BY RESOLUTION JULY 10, 1876,
UNITED STATES HOUSE OF REPRESENTATIVES.

Official :

E. D. TOWNSEND,
Adjutant-General.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE, July 15, 1876.

DEPARTMENT OF THE INTERIOR,
Washington, November 29, 1875.

SIR: I have the honor to transmit herewith a copy of a letter dated the 27th instant, from the Commissioner of Indian Affairs, together with a copy of the special report, dated the 9th instant, from E. C. Watkins, United States Indian inspector, therein mentioned, in relation to the status and condition of certain wild and lawless bands of Sioux Indians, giving an expression of his views in reference to the future action of the Government toward them.

The subject is respectfully presented for the consideration and action of the honorable the Secretary of War.

I have the honor to be, very respectfully, your obedient servant,
Z. CHANDLER,
Secretary.

HON. SECRETARY OF WAR.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., November 27, 1875.

SIR: I have the honor to transmit, herewith inclosed, a special report from E. C. Watkins, United States Indian inspector, dated the 9th instant, in relation to the status and condition of certain wild and lawless bands of Sioux Indians, giving an expression of his views in reference to the future action of the Government toward them.

Inspector Watkins refers to Sitting Bull's band and others who roam over Western Dakota and Eastern Montana, including the rich valleys of the Yellowstone and Powder Rivers, and make war on the Arickarees, Mandans, Gros Ventres, Assinaboines, Blackfeet, Piegaus, Crows, and other friendly tribes, and he suggests, for reasons stated by him, that one thousand men, under the command of an experienced officer, be sent into the country of these hostile Indians, numbering but a few hundred, during the winter season, and compel them to submit to the authority of the Government

I respectfully recommend that this communication be referred to the War Department for consideration and such action as may be deemed best by Lieutenant-General Sheridan, who is personally conversant with the situation on the Upper Missouri, and with the relations of Sitting Bull's band to the other Sioux tribes.

Very respectfully, your obedient servant,

EDW. P. SMITH,
Commissioner.

HON. SECRETARY OF THE INTERIOR.

WASHINGTON, D. C., November 9, 1875.

SIR: I have the honor to address you in relation to the attitude and condition of certain wild and hostile bands of Sioux Indians in Dakota and Montana, that came under my observation during my recent tour through their country, and what I think should be the policy of the Government toward them.

I refer to "Sitting Bull's" band and other bands of the Sioux Nation, under chiefs or "head-men" of less note, but no less untamable and hostile. These Indians occupy the center, so to speak, and roam over Western Dakota and Eastern Montana, including the rich valleys of the Yellowstone and Powder Rivers, and make war on the Arickarees, Mandans, Gros Ventres, Assinaboines, Blackfeet, Piegans, Crows, and other friendly tribes on the circumference.

Their country is probably the best hunting-ground in the United States, a "paradise" for Indians, affording game in such variety and abundance that the need of Government supplies is not felt. Perhaps for this reason they have never accepted aid or been brought under control. They openly set at defiance all law and authority, and boast that the United States authorities are not strong enough to conquer them. The United States troops are held in contempt, and surrounded by their native mountains, relying on their knowledge of the country and powers of endurance, they laugh at the futile efforts that have thus far been made to subjugate them, and scorn the idea of white civilization.

They are lofty and independent in their attitude and language to Government officials, as well as the whites generally, and claim to be the sovereign rulers of the land. They say they own the wood, the water, the ground, and the air, and that white men live in or pass through their country but by their sufferance.

They are rich in horses and robes, and are thoroughly armed. Nearly every warrior carries a breech-loading gun, a pistol, a bow and quiver of arrows.

From their central position they strike to the east, north, and west steal horses and plunder from all the surrounding tribes, as well as frontier settlers, and luckless white hunters or emigrants who are not in sufficient force to resist them; and fortunately indeed, is the man who thus meets them if, after losing all his worldly possessions, he escapes with his scalp.

And yet these Indians number, all told, but a few hundred warriors, and these are never all together or under the control of one chief.

In my judgment, one thousand men, under the command of an experienced officer, sent into their country in the winter, when the Indians are nearly always in camp, and at which season of the year they are the most helpless, would be amply sufficient for their capture or punishment.

The Government has done everything that can be done peacefully to get control of these Indians, or induce them to respect its authority. Every effort has been made, but all to no purpose. They are still as wild and untamable, as uncivilized and savage, as when Lewis and Clarke first passed through their country.

The injurious effects of the repeated attacks made by these bands on the peaceful friendly tribes heretofore mentioned cannot be overestimated. No people can reasonably be expected to make progress in the arts of peace if they must be constantly armed and prepared to defend their homes and property. No Indians can be expected to "civilize," to learn to cultivate the soil, or the mechanic arts, if while they have the implement of labor in one hand they must carry the gun in the other for self-defense. Their natural instincts come to the surface at once, and, the Indian agent or missionary who is zealously laboring for the advancement of the people under his care, or to carry out the humane policy of our Government, the *only* policy worthy an enlightened, Christian nation, finds his labors vastly increased and discouragements multiplied by this state of affairs.

These wild bands are but as a drop in the bucket in number, compared to the great body of Indians who have accepted the peaceful policy, made treaties with the Government, and are keeping them, or have been supplied with provisions, goods, and farming-implements without treaty-stipulations, are under the care of agents, friendly, and make fair progress in the road of civilization.

In interviews with the Indians along the Missouri River and through Montana, during my recent tour of inspection, they invariably spoke of this subject, and complained bitterly that the Government was not protecting them as it had promised, and frequently closed the case by saying they might just as well go out and kill white men as to try to be good Indians, for they got no protection or extra reward for being good. When I told them these Sioux would be punished, they said, "We have heard that before; we'll wait and see." While I am not disposed to be needlessly alarmed, and do not agree with the writers of articles published in numerous territorial papers of a sensational character on this subject, yet I think there is danger of some of the young warriors from friendly tribes falling off and joining with these hostile bands, until with these accessions they would be somewhat formidable, and might make a simultaneous attack on the white settlers in some localities, if they are thus allowed to gather head.

The true policy, in my judgment, is to send troops against them in the winter, the sooner the better, and *whip* them into subjection. They richly merit the punishment for their incessant warfare on friendly tribes, their continuous thieving, and their numerous murders of white settlers and their families, or white men wherever found unarmed.

The Government owes it, too, to these friendly tribes, in fulfillment of treaty-stipulations. It owes it to the agents and employes whom it has sent to labor among the Indians at remote and almost inaccessible places, beyond the reach of aid in time to save. It owes it to the frontier settlers who have, with their families, braved the dangers and hardships incident to pioneer life. It owes it to civilization and the common cause of humanity.

Very respectfully, your obedient servant,

E. C. WATKINS,
United States Indian Inspector.

Hon. E. P. SMITH,
Commissioner Indian Affairs, Washington, D. C.

DEPARTMENT OF THE INTERIOR,
Washington, December 3, 1875.

SIR: Referring to my letter to you dated the 29th ultimo, relative to the status of certain hostile Sioux Indians residing outside of their reservations and remote from any agency, and requesting that steps be taken to compel them to go upon a reservation and cease their depredations, I have the honor to inform you that I have this day directed the Commissioner of Indian Affairs to notify said Indians that they must remove to a reservation before the 31st day of January next; that if they neglect or refuse so to remove, they will be reported to the War Department as hostile Indians, and that a military force will be sent to compel them to obey the orders of the Indian Office.

You will be notified of the compliance or non-compliance of the Indians with this order; and if said Indians shall neglect or refuse to comply with said order, I have the honor to request that the proper military officer be directed to compel their removal to and residence within the bounds of their reservation.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The Hon. SECRETARY OF WAR.

WAR DEPARTMENT,
Washington City, December 7, 1875.

SIR: In reply to your letter of the 3d instant, and referring to your previous letter of the 29th ultimo, stating that the Commissioner of Indian Affairs has been directed to notify the hostile Sioux Indians outside of their reservation that they must remove to a new reservation before the 31st day of January next, and that the War Department will be informed of their compliance or non-compliance with this order, I have the honor to inform you that copies of your two communications—November 29 and December 3—will be transmitted to the proper military officer.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The Hon. SECRETARY OF THE INTERIOR.

Indorsements on copy letters November 29 and December 3, 1875, from Interior Department.

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, December 11, 1875.

Official copies respectfully referred through headquarters of the Army to the commanding general of the Division of the Missouri.

By order of the Secretary of War:

E. D. TOWNSEND,
Adjutant-General.

HEADQUARTERS OF THE ARMY,
Saint Louis, December 13, 1875.

Respectfully referred to Lieut. General P. H. Sheridan, commanding Division of the Missouri, for report as to the feasibility of military operations against Sitting Bull and his tribe this winter.

By command of General Sherman:

A. McD. MCCOOK,
Colonel and A. D. C.

[Telegram.]

HEADQUARTERS ARMY OF THE UNITED STATES,
Saint Louis, Mo., January 5, 1876.

Col. R. C. DRUM, *Chicago, Ill. :*

Please return papers covering reports of Indian Inspector Watkins. Letter of January 4th received.

WHIPPLE,
Assistant Adjutant-General.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, January 5, 1876.

Respectfully returned to the headquarters of the Army, as requested by telegram of this date.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

HEADQUARTERS OF THE ARMY,
Saint Louis, January 7, 1876.

Respectfully returned to the Secretary of War, inviting attention to General Sheridan's letter, herewith inclosed. Midwinter is the best time to strike hostile Indians in the latitude of the Yellowstone, but we should have timely notice of the object to be accomplished, and the means for its attainment.

W. T. SHERMAN,
General.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, Ill., January 3, 1876.

GENERAL: I have the honor to reply to your requests as indorsed on certain papers forwarded from the Secretary of the Interior, requesting military operations against the Sioux Indians in case they refuse to occupy the reservation assigned them by the Indian Bureau, on or before the 31st day of January, 1876.

* * * * *
As Generals Terry and Crook command the departments in which these hostile Indians are located, I respectfully forward their opinions on the subject:

General Terry is of the opinion that Sitting Bull's band of hostile Indians is encamped at or near the mouth of Little Missouri, and that it can be reached by a quick movement, which may be decisive at this season of the year, and that he has sufficient troops and means to make such a movement.

General Crook is of the opinion that operations can be undertaken in his department against bands of hostile Sioux Indians whenever, in the opinion of the Indian Bureau, such action becomes necessary.

As the commands of these two officers embrace all the Indians against whom military action was contemplated, it will be seen that the movement is considered practicable, and I earnestly request, should operations be determined upon, that directions to that effect be communicated to me as speedily as possible, so that the enemy may be taken at the greatest disadvantage.

Very respectfully, your obedient servant,

P. H. SHERIDAN,
Lieutenant-General.

Gen. W. T. SHERMAN,
Headquarters of the Army, Saint Louis, Mo.

WAR DEPARTMENT,
Washington City, January 12, 1876.

SIR: Referring to a previous correspondence with your Department on the subject of the appearance of hostile bands of Sioux outside of their reservation, I have now the honor to transmit copy of a report of the commanding general Division of the Missouri, concerning these Indians, and to invite your attention to the requests of General Sheridan, concurred in by the General of the Army, that should operations against them be determined upon, he may be so advised as speedily as possible.

Very respectfully, your obedient servant,

H. T. CROSBY,
Chief Clerk, for the Secretary of War in his absence.

The Hon. SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, January 22, 1876.

SIR: I have the honor to transmit herewith, for the information of the honorable the Secretary of War, a copy of a communication dated the 21st instant, from the Commissioner of Indian Affairs, in relation to the movement contemplated against the hostile and lawless bands of Sioux Indians, which was the subject of the letter from the War Department of the 12th instant, transmitting copy of report of the commanding general Department of the Missouri, and calling attention to indorsement of General Sheridan, requesting to be informed of any action to be taken in the premises.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The Hon. SECRETARY OF WAR.

[Inclosure to above.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., January 21, 1876.

SIR: By Department reference of the 13th instant, I am in receipt of communication from the honorable the Secretary of War inviting attention to the indorsement of Lieutenant-General Sheridan, (therewith inclosed,) that should operations against the hostile bands of Sioux outside their reservation be determined on, the military may be so advised as speedily as possible.

From this indorsement, it appears to be the opinion of the accomplished officers under whose immediate supervision any movement against these Indians would be conducted, an opinion in which the General and Lieutenant-General of the Army concur, that such a movement at this season of the year is entirely practicable.

I am disposed to believe, also, although the question is not specifically raised by these papers, that the officers whose opinions are thus given have no doubt as to their ability to restrain, with the troops at their command, any possible outbreak (by way of a diversion in favor of Sitting Bull and the Indians who will be the direct objects of the attack) of the bands of Sioux now at the several agencies.

In compliance with your direction, I have the honor to report that the indorsement of Lieutenant-General Sheridan, above mentioned, was called out by a communication from this office of November 27 last, in which the then Commissioner invited attention to the trouble which Sitting Bull and other lawless Sioux, ranging over certain parts of Dakota and Montana, were giving to friendly Indians, and to white settlers within their reach; this communication having been referred by you in compliance with his recommendation to the War Department.

Since the date of this communication, viz, on the 6th ultimo, my predecessor, acting under your instructions, directed the agents at the Red Cloud, Spotted Tail, Lower Brulé, Crow Creek, Cheyenne River, Standing Rock, Devil's Lake, and Fort Peck agencies to communicate, if practicable, to Sitting Bull and the other hostile Indians, the requirements of the Government that they return within the bounds of their reservation on or before the 31st instant. Agent Howard, of the Spotted Tail agency, reported, under date of 3d instant, his belief that their demands had by that time reached the northern camps, and that Sitting Bull is fully advised of the intentions of the Government.

Some of the agents named have not been heard from in regard to this matter, while no one has as yet clearly expressed a belief concurrent with that of Agent Howard. In my opinion, however, enough has been done to fully commit the Department to the policy of restraining by force of arms any further outbreak or insubordination on the part of these defiant and hostile bands should they refuse to comply before 31st instant with the demands there made upon them. Certainly I can conceive of nothing more damaging to the authority of the Government, not yet fully recognized by other bands of Sioux, than a failure to execute threats of military operations so clearly made.

In further execution of the policy thus determined upon, and with a desire to afford the fullest information to all officers interested, I directed, on the 19th instant, the agents at the Red Cloud, Spotted Tail, Standing Rock, and Cheyenne River agencies, who would in my view be most likely to obtain reliable and early news of Sitting Bull's intentions and movements, to keep me fully advised by letter and telegraph of his acceptance or rejection of the conditions imposed upon him, or of any other intelligence concerning him.

Any information which I may receive in compliance with these instructions will be forwarded without delay to you for transmission to the honorable the Secretary of War.

The communication of the honorable the Secretary of War is herewith returned.

I have the honor to be, very respectfully, your obedient servant,
J. Q. SMITH,
Commissioner.

The Hon. SECRETARY OF THE INTERIOR.

[First indorsement.]

Respectfully referred to the Adjutant-General to refer to the General and Lieutenant-General for their views, and for report as to whether the Department should now undertake an expedition against these refractory bands.

WM. W. BELKNAP,
Secretary of War.

JANUARY 26, 1876.

WAR DEPARTMENT,
Washington City, January 26, 1876.

SIR: I have the honor to acknowledge the receipt of your letter of the 22d instant, relative to the movements contemplated against the hostile and lawless bands of Indians, with inclosure of letter from the Commissioner of Indian Affairs, reporting that in his opinion enough has been done to commit the Department to the policy of restraining by force of arms any further outbreaks, should these Indians refuse to comply by the 31st instant with the demands of the Department for their return to their reservation, &c., and to state, in reply thereto, that your communication has been referred to the General and Lieutenant-General of the Army for their views, and report as to whether this Department should now undertake an expedition against these refractory bands.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

To the honorable the SECRETARY OF THE INTERIOR.

[Indorsements on copy letter January 22, 1876, from the Department of the Interior:]

[First indorsement.]

Official copy respectfully referred to the General and the Lieutenant-General of the Army for their views, and for report as to whether the Department should now undertake an expedition against these refractory bands.

By order of the Secretary of War:

E. D. TOWNSEND,
Adjutant-General.

W. D., A. G. O., JANUARY 28, 1876.

[Second indorsement.]

HEADQUARTERS OF THE ARMY,
Saint Louis, February 2, 1876.

Respectfully referred to the Lieutenant-General for remark.

By command of General Sherman:

WM. D. WHIPPLE,
Assistant Adjutant-General.

[Third indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, February 4, 1876.

Respectfully returned. Generals Terry and Crook notified these headquarters on December 28th and 22d, respectively, that they could move against these Indians. I inclose copy of reports above referred to.

It is now for the Indian Bureau to make its decision on the subject. The matter of notifying the Indians to come in is perhaps well to put on paper, but it will in all probability be regarded as a good joke by the Indians. If it is intended that the military should operate against these Indians, I may safely say that every possibility of success will vanish unless directions are immediately given. I fully comprehend the difficulties of the country inhabited by these hostile bands, and unless they are caught before early spring, they cannot be caught at all. Generals Terry and Crook should be notified, one way or the other, without delay.

P. H. SHERIDAN.
Lieutenant-General.

[Inclosures to above (third) indorsement.]

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., December 28, 1875.

SIR: Referring to your indorsement of the 20th instant, upon a copy of correspondence between the War and Interior Departments, relative to operations against Sitting Bull and his band, in case they should refuse to obey the order of the Commissioner of Indian Affairs, directing them to remove to the reservation which is set apart for them in common with the other bands of the Sioux Nation, I have the honor to report that information from various sources tends to show that these Indians are now encamped for the winter on the Little Missouri; it is believed that they are near the mouth. If this information is correct it will be possible in ordinary winter weather to reach their camp by a rapid march from Fort Abraham Lincoln. For such an operation there are available five well-mounted companies of cavalry at Lincoln and two at Fort Rice; a force which, I think, would be sufficient. Such an operation must, of course, be conducted with secrecy and rapidity, for it would not be possible for cavalry to follow the Indians for any considerable distance should they receive notice of the approach of troops and seek safety in dispersion and flight. It would be impracticable to carry supplies of food and forage for more than a very few days.

In view of the conversation which I had with the Lieutenant-General upon this subject when I was in Chicago week before last, I have not felt at liberty to communicate even to any of my staff that such operations have been contemplated, nor have I felt at liberty to take any steps to ascertain the precise position of Sitting Bull's camp.

I think that this information can be obtained by sending out scouts from Fort Stevenson without exciting suspicion. Sitting Bull doubtless knows that the garrison of that post consists entirely of infantry, and that he has nothing to fear from it. He would pay little attention to a movement from that quarter, even if it were discovered. If the Lieutenant-General shall approve of this suggestion, I will send confidential instructions to Lieutenant-Colonel Huston, the post commander, to obtain this information as if for his own purposes.

I have the honor to be, sir, very respectfully, your obedient servant,
ALFRED H. TERRY,
Brigadier-General, Commanding.

To the ASSISTANT ADJUTANT-GENERAL,
Division of Missouri, Chicago, Ill.

HEADQUARTERS DEPARTMENT OF THE PLATTE,
Omaha, Nebr., December 22, 1875.

GENERAL: Referring to your indorsement of the 20th instant, on communication from the honorable the Secretary of the Interior, relative to certain hostile bands of Sioux Indians, and requesting report as to the feasibility of military operations against them, I have the honor to state that military operations may be commenced against them whenever, in the opinion of the Department, such action becomes necessary.

I recommend that the Department communicate their decision at the earliest date practicable, in order that operations may be commenced before spring weather comes.

I am, general, very respectfully, your obedient servant,
GEORGE CROOK,
Brigadier-General, Commanding Department.

To the **ASSISTANT ADJUTANT-GENERAL,**
Headquarters Military Division of the Missouri, Chicago, Ill.

[Fourth indorsement.]

HEADQUARTERS ARMY OF THE UNITED STATES,
Saint Louis, Mo., February 7, 1876.

Respectfully returned to the Secretary of War, whose instructions as contained in his indorsement of the 4th instant, on copy of letter from the Interior Department, (this day received,) have been referred to the Lieutenant-General for action.

W. T. SHERMAN;
General.

DEPARTMENT OF THE INTERIOR,
Washington, January 25, 1876.

SIR: Referring to Department letter addressed to you under date of the 22d instant, in relation to the movements contemplated against the hostile and lawless bands of Sioux, I have the honor to transmit herewith copy of communication dated 24th instant, from the Commissioner of Indian Affairs, with extract from letter of Agent Burke, Standing Rock agency, relative to the probable movements of Sitting Bull and his band.

Very respectfully, your obedient servant,
Z. CHANDLER,
Secretary.

The honorable the **SECRETARY OF WAR.**

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., January 24, 1876.

SIR: Referring to my communication of the 21st instant, I forward herewith, to be laid by you, if deemed advisable, before the honorable Secretary of War, copy of so much of a communication of the 31st ult., this day received from John Burke, esq., United States Indian agent at the Standing Rock agency, as relates to the probable movements of Sitting Bull and his band of hostile Indians.

Very respectfully, your obedient servant,
J. Q. SMITH,
Commissioner.

The honorable the **SECRETARY OF THE INTERIOR.**

[Extract from letter of John Burke, United States Indian agent, Standing Rock agency, Dakota, December 31, 1875.]

"On the 22d of the month I received Department letter dated December 6, 1875, directing me to notify Sitting Bull's band, and other wild and lawless bands of Sioux Indians, who are outside of their reservation and making war on friendly tribes of Indians, to cease so doing and remove within the boundaries of their reservation on or before the 31st of January next, otherwise they will be deemed hostile and treated accordingly by the military force. Upon the receipt of said letter I took immediate measures for the carrying out of said orders, by sending some trustworthy, reliable, and friendly Indians to the several hostile camps to notify them of the orders, and will also in a few days send one of my agency employes to Fort Berthold, D. T., where I have directed any of the Indians so notified who may desire to come to this agency to meet and accompany him here, as a precautionary measure to guard against trouble that might arise should they encounter any military force on their journey here. I have no doubt but that a large number of these wild and lawless Indians will come to this agency and accept the conditions of the treaty of 1868. I am strengthened in this belief from the fact that many of them had already sent word to their Indian relations and friends now peaceably settled on this reservation of their intention to do so the present winter or early the coming spring, in view of which I respectfully invite the attention of the Department to the necessity of providing for their subsistence and maintenance."

WAR DEPARTMENT,
Washington City, January 29, 1876.

SIR: Referring to your letter of the 25th instant, transmitting copy of communication from the Commissioner of Indian Affairs and extract from letter of Agent Burke, Standing Rock agency, relative to the probable movements of Sitting Bull and his band, I have the honor to inform you that the papers have been referred to the proper military commander.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

To the honorable the SECRETARY OF THE INTERIOR.

Copy Interior Department letter January 23, 1876, referred to General of the Army February 2, 1876.

DEPARTMENT OF THE INTERIOR,
Washington, February 1, 1876.

SIR: On the 3d December last I had the honor to address a communication to you relative to the hostile Sioux roaming in the Powder River country, under the leadership of Sitting Bull, informing you that I had directed couriers to be sent from each of the Sioux agencies, informing that chief that he must come in with his followers to one of the Sioux agencies before the 31st ultimo, prepared to remain in peace near the agency, or he would be turned over to the War Department, and

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the Army be directed to compel him to comply with the orders of this Department.

The time given him in which to return to an agency having expired, and the advices received at the Indian Office being to the effect that Sitting Bull still refuses to comply with the directions of the Commissioner, the said Indians are hereby turned over to the War Department for such action on the part of the Army as you may deem proper under the circumstances.

I inclose copy of communication from the Commissioner of Indian Affairs, dated the 31st ultimo, recommending that hostilities be commenced.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., 31st January, 1876.

SIR: I have the honor to forward herewith copy of telegram just received from Agent Burke, of Standing Rock agency, in which the agent desires an extension of the time limited for the submission of Sitting Bull to the demands of Government, and a postponement of the hostilities against him now in contemplation.

I also forward copy of so much of a communication this day received from Agent Bingham, at Cheyenne River, upon this matter as shows his action under previous instructions to notify Sitting Bull.

As the time limited by the Department has expired without the receipt of any news of Sitting Bull's submission, I see no reason why, in the discretion of the honorable the Secretary of War, military operations against him should not commence at once.

I have the honor to be, very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

The honorable the SECRETARY OF THE INTERIOR.

CHEYENNE RIVER AGENCY, DAK.,
January 24, 1876.

SIR: I have the honor to acknowledge receipt of your letter of 10th instant, (G. W. S.,) instructing me to obey, if possible, the instructions contained in yours of 6th ultimo, relative to Sitting Bull's and other wild bands of Indians, and to use my best endeavors to subsist all Indians under my care up to the close of the present fiscal year from the supplies on hand, and the beef to be furnished, so that no deficiencies may exist.

In reply I will state that, in addition to publicly notifying the Indians of this agency of the intention of the Government, and thereby giving them an opportunity to convey the information to their friends at the hostile camps, I have sent special delegations of Indians to the camps of the wild band, inviting them to come to this reservation, and warning them that if such invitation was not accepted before the 31st instant

they will be treated as enemies of the Government, and receive the chastisement due those whose opposition is unreasonable and uncalled for.

* * * * *

Very respectfully, your obedient servant,

H. W. BINGHAM,
United States Indian Agent.

[Telegram.]

STANDING ROCK, DAK.,
January 30, 1876.

Honorable COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C. :

Man I sent to Berthold to meet representative from hostile camp returned. Communication intercepted. About thirty Indians, composed, it is reported, of the Two Kettle, Minneconjoux, and Sans Arc bands of Sioux, on the night of the 11th, raided and stole horses from Gros Ventres, and were pursued by Berthold Indians and four of them killed. This circumstance prevented members of hostile bands from meeting representatives and delayed communication from the Indian couriers. I look for good results from movements I have inaugurated, and respectfully urge an extension of time on account of the trouble from this foray and the great length of the journey to hostile camp this inclement season.

JOHN BURKE,
United States Indian Agent.

[Indorsements.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, February 4, 1876.

Official copy respectfully referred to the General of the Army, to take immediate steps to compel these Indians to return and remain upon their reservation, as requested by the Interior Department.

By order of the Secretary of War:

E. D. TOWNSEND,
Adjutant-General.

WAR DEPARTMENT,
Washington City, February 3, 1876.

SIR: Acknowledging the receipt of your letter of the 1st instant, stating that the time given Sitting Bull and his followers to repair to an agency having expired, and this chief still refuses to comply with the directions of the Commissioner, and turning the case over to the War Department, in accordance with the recommendation of the Indian Bureau that hostilities be commenced against these Indians, I have the honor to inform you that the Adjutant-General has directed the General of the Army to take immediate measures to compel these Indians to return to and remain upon their reservation, as requested by your Department.

WM. W. BELKNAP,
Secretary of War.

To the honorable the SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, January 19, 1876.

SIR: I have the honor to transmit herewith, for your information, a copy of a letter, dated the 18th instant, from the Commissioner of Indian Affairs, in relation to the action taken by the Indian Bureau, under instructions from this Department, concerning the sales of arms and ammunition to Indians at the following agencies: Red Cloud and Spotted Tail, in Nebraska; Standing Rock, Crow Creek, White River, and Cheyenne River, in Dakota; Fort Belknap and Fort Peck, in Montana; and, in accordance with the suggestion therein contained, invite the co-operation of the War Department in carrying into effect the instructions promulgated.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

[First inclosure.]

DEPARTMENT OF THE INTERIOR,
 OFFICE OF INDIAN AFFAIRS,
Washington, D. C., January 18, 1876.

SIR: In accordance with your verbal instructions of yesterday, this office has telegraphed to the agents respectively in charge of the following agencies: Red Cloud and Spotted Tail, in Nebraska; Standing Rock, Crow Creek, White River, and Cheyenne River, in Dakota; and Fort Belknap and Fort Peck, in Montana, to stop all sales of arms and ammunition to the Indians of said agencies, and to seize any such articles likely to reach the Indians.

I beg leave to suggest the propriety of advising the War Department of the action taken in the matter; and also of inviting the co-operation of the military in carrying into effect the instructions given in the dispatches referred to.

Very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

The honorable the SECRETARY OF THE INTERIOR.

[Second inclosure.]

WAR DEPARTMENT,
Washington City, January 22, 1876.

SIR: I have the honor to acknowledge the receipt of your letter of the 19th instant, transmitting copy of communication from the Commissioner of Indian Affairs relative to the action taken by the Indian Bureau concerning the sale of arms and ammunition to Indians at the following agencies: Red Cloud and Spotted Tail, Nebraska; Crow Creek, Standing Rock, White River, and Cheyenne River, Dakota; Fort Belknap and Fort Peck, Montana, and requesting the co-operation of the Department in carrying out the instructions promulgated, and in reply to inform you that the action of your Department in the matter

has been concurred in, and the Adjutant-General of the Army has been directed to issue the necessary instructions to the military commanders, as requested.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

To the honorable the SECRETARY OF THE INTERIOR.

[Indorsement on copy of communication of January 19, 1876, from the Interior Department.]

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington, January 26, 1876.

Approved, and official copy respectfully referred, through headquarters of the Army, to the commanding general, Military Division of the Missouri, to issue necessary instructions to military commanders.

By order of the Secretary of War :

E. D. TOWNSEND,
Adjutant-General.

DEPARTMENT OF THE INTERIOR,
Washington, February 10, 1876.

SIR: I have the honor to transmit herewith, for the information of the honorable the Secretary of War, a copy of a report, dated the 9th instant, from the Commissioner of Indian Affairs, and copies of accompanying letters from Agents Bingham and Darling, in relation to movements of Sitting Bull and his band.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

[First inclosure.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., February 9, 1876.

SIR: I have the honor to submit herewith, to be furnished the War Department for information, if deemed advisable, a copy of a letter from A. W. Bingham, United States agent Cheyenne River agency, Dakota Territory, dated 26th ultimo, in which that agent says he apprehends no trouble from Sitting Bull; also, copy of two letters from C. W. Darling, United States agent Fort Berthold agency, Dakota Territory, dated, respectively, 24th and 15th ultimo, reporting the presence of Sitting Bull and his followers upon the reservation of the Fort Berthold agency Indians; the raiding by some of his people on the 11th or 12th ultimo upon the Gros Ventres' winter-quarters; the stealing of horses therefrom; the pursuit of the raiders by Indians from Fort Berthold agency, and fight between the parties.

Very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

The honorable the SECRETARY OF THE INTERIOR.

[Second inclosure.]

CHEYENNE RIVER AGENCY,
January 26, 1876.

SIR: Referring to your telegram of the 21st instant, in which I am instructed to keep you constantly advised, by letter and telegram, of all news from "Sitting Bull," I have the honor to inform you that from such information as I can obtain from runners arriving at the agency, I have no reason to apprehend trouble from the Indian named. In this connection I will state that, so far as my information goes, the Indians have not been so quiet or friendly-disposed for a long time as they are now, and the intimation of a renewal of hostilities was a surprise, not only to me, but to all the Indians under my charge, who disclaim all knowledge of any such intention on the part of themselves, or their less civilized friends, called for the sake of distinction "hostile." They blame the newspapers for publishing sensational reports for which there is no foundation, but simply calculated to prejudice the Government and its officers against the Indians, who have no means of contradicting such statements, unless through their agents.

All news of "Sitting Bull," or any other wild bands that I can learn, will be promptly laid before you.

Very respectfully, your obedient servant,

H. W. BINGHAM,
United States Indian Agent.

Hon. J. Q. SMITH,
Commissioner of Indian Affairs, Washington, D. C.

[Third inclosure.]

FORT BERTHOLD, DAK., January 15, 1876.

SIR: I have the honor to state that on the night of the 11th or early morning of the 12th instant a band of hostile Sioux Indians succeeded in stealing 25 horses from the Gros Ventres' winter-quarters, at the mouth of the Little Missouri River, about 25 miles above this agency. The theft was soon discovered, and a party of Gros Ventres and Mandans at once followed them, overtaking a small party who were on foot, (at the head of Beaver Creek, a small stream which flows into the Missouri River on the west side, about 8 miles above the agency,) killing one and wounding another at this point. The party of Gros Ventres and Mandans, being re-enforced, followed up the main trail, which led to Turtle Mountain, situated at the head of one of the forks of Big Knife River, about 40 miles from Fort Berthold, nearly west. The Sioux were evidently making for their camp on the Yellowstone River, and late in the night of the 12th the party of Fort Berthold Indians discovered about 30 of the raiders in the bad lands north of the Little Missouri River, and in the fight which ensued killed three, wounded several more, but recovering only two of the stolen horses.

That these Indians were from Sitting Bull's camp of Uncpapas I believe, as they were making direct for it on the Yellowstone River, and that so far the treaty of peace effected last summer at Fort Lincoln with the Sioux of Standing Rock and Cheyenne agencies has not been broken. Also Mr. Chas. Reynolds (an employé of the agency) reports, on his arrival to-day at the agency, that he was within 15 miles of Turtle Mountain, on the west side of the Missouri River, having gone from the mouth of Big Knife River to that point, and no Indians from below had crossed that stream on their way here, which they must have done had they been from Standing Rock or Cheyenne agencies. From the

best information possible to get here, Sitting Bull has about 500 lodges of lawless ruffians with him, in fact the home of the very worst Indians in the Northwest. This affair is very much to be regretted at this time, as this agency Indians, the Arickarees in particular, had begun to think that the long war waged against them by the Sioux had at last terminated, and were turning their attention to the pursuits of peace. All agree that never before has there been anything like the desire they now exhibit to work and adopt the customs of civilized life. But this raid has seemed to almost craze them; all can think of nothing but scalps and revenge for old and almost forgotten wrongs. I am convinced that, if these hostile bands of Indians could be kept away from this agency and not allowed to come on the reservation, it would not be but a short time before all, or nearly all, would be at work doing something for themselves. No doubt now but we shall soon receive a visit from a large war-party seeking revenge for the hair lost by the late raiders; shall keep a sharp lookout for and hope not to be troubled by them. I was in hopes the Government would put its strong and heavy hand upon this band of red rascals, who seem to defy and laugh at every effort made to compel good behavior. I think a good thrashing would do them good and save lives in the end.

I am, sir, very respectfully, your obedient servant,

C. W. DARLING,
United States Indian Agent.

Hon. COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.

[Fourth inclosure.]

FORT BERTHOLD, UNITED STATES INDIAN AGENCY, D. T.,
January 24, 1876.

SIR: I have the honor to report that the large band of hostile Sioux, under the leadership of Sitting Bull, are still encamped on the reservation of the Indians of my agency. This is very injurious to the interests of the service. The close proximity of a large band of hostile Sioux exercises a demoralizing influence in furnishing a place of refuge for the lawless, and preventing, and almost stopping, the industry of the peaceable Indians. Besides it is a serious loss to the Government, as the Indians of this agency have been compelled to give up hunting, the only part of their reservation where game can be found being occupied by these hostile Sioux. Last winter it was quite usual for large parties of Rees, Gros Ventres, and Mandans to start out on a hunt, and be gone six weeks at a time, bringing home plenty of game, and I have no doubt were Sitting Bull's band driven off to their own reservation, and compelled to stay there, that at a moderate estimate 10,000 pounds of good, wholesome meat could be procured (at the point now occupied by Sitting Bull) within a short period, thereby saving the Government this amount of beef or other supplies.

I would respectfully but strongly urge on the Department the absolute necessity of driving Sitting Bull and his band of lawless Indians off the reservation of the Indians of my agency with as little delay as practicable.

I am, sir, very respectfully, your obedient servant,

C. W. DARLING,
United States Indian Agent.

Hon. COMMISSIONER OF INDIAN AFFAIRS,
Washington, D. C.

WAR DEPARTMENT,
Washington City, February 15, 1876.

SIR: Referring to your letter of the 10th instant, and its inclosures, copies of a report of the Commissioner of Indian Affairs and of letters from Agents Bingham and Darling, relative to the movements of "Sitting Bull" and his band, I have now the honor to state that General Sheridan, who is now in the city, has seen these papers, and, in accordance with his request, copies of them will be forwarded to his headquarters, and also to General Terry.

Very respectfully, your obedient servant,
WM. W. BELKNAP,
Secretary of War.

To the honorable the SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR.
Washington, February 17, 1876.

SIR: I have the honor to transmit herewith, for your information, copy of communication, dated 16th instant, from the Commissioner of Indian Affairs, and copy of letter from Agent Hastings, reporting that Crazy Horse and Black Twin, Ogallalla chiefs, and leaders of hostile Sioux, are now on their way to the Red Cloud agency with their people, and that the couriers sent to Cheyenne camp are daily expected.

Very respectfully, your obedient servant,
Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

[First inclosure.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., February 15, 1876.

SIR: I have the honor to submit herewith, for the information of the Department, copy of a letter dated the 28th ultimo, from James S. Hastings, United States agent for the Indians of Red Cloud agency, Nebraska, in which he says that it is reported that Crazy Horse and Black Twin, Ogallalla chiefs, and leaders of the hostile Sioux camp, are now on the way to the Red Cloud agency, with their people, and that the couriers sent to the Cheyenne camp are daily expected.

Very respectfully, your obedient servant,
J. Q. SMITH,
Commissioner.

The honorable the SECRETARY OF THE INTERIOR.

[Second inclosure.]

RED CLOUD AGENCY, NEBRASKA,
January 28, 1876.

SIR: Your telegram of the 20th instant, directing that you be advised as to the whereabouts of Sitting Bull, is received. In reply, I have to

inform you that last fall he separated from the hostile camp on Powder River and started for the Yellowstone; since then nothing has been heard from him. He is an Uncpapa, and belongs at Standing Rock agency, from which point he could be reached with less difficulty than from here. It is reported here that Crazy Horse and Black Twin, Ogallalla chiefs, and leaders of the hostile Sioux camp, to whom I sent word that they must come into the agency, are now *en route* to this place with their people; their progress is somewhat retarded on account of deep snow; when heard from they were at Bear Buttes, about one hundred miles distant. It is said that these two chiefs did not participate in the treaty of 1868; have never been on any agency; hitherto refusing to accept the bounty of the Government, and persistently declared their intention to remain at war with the whites, which they have incessantly carried on for the past seven years.

The couriers who were sent to notify the Cheyenne camp, which is located about one hundred miles beyond the Sioux, have not yet been heard from, but are daily expected.

In connection with the above, I have to inform the Department that couriers could not be obtained to go north without the promise of a reward for their services, and would respectfully request that I be authorized to purchase on their return presents to the amount of one hundred and fifty dollars.

Very respectfully, your obedient servant,

JAS. S. HASTINGS,
United States Indian Agent.

Hon. J. Q. SMITH,
Commissioner Indian Affairs, Washington, D. C.

P. S.—There are supposed to be between three and four thousand in the party.

J. S. H.

[Third inclosure.]

WAR DEPARTMENT,
Washington City, February 19, 1876.

SIR: I have the honor to acknowledge the receipt of your letter of the 17th instant, transmitting copy of a communication from the Commissioner of Indian Affairs and a letter from Agent Hastings, relative to the report that Crazy Horse and Black Twin, Ogallalla chiefs, and leaders of hostile Sioux, are on their way to the Red Cloud agency with their people, &c., and to inform you that the information has been sent to the General of the Army.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

The honorable SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, February 21, 1876.

SIR: I have the honor to transmit herewith, for your information, copy of a communication of this date from the Commissioner of Indian

Affairs and inclosed copy of letter from Agent Bingham, Cheyenne River agency, reporting Sitting Bull and his band to be peaceably inclined.

Very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

[First inclosure.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., February 21, 1876.

SIR: Under date of the 12th instant, Agent Bingham, of the Cheyenne River agency, reports the return to his agency of one of the delegations sent out to communicate with Sitting Bull, with the report that his band of Indians appears to be peaceably inclined.

A copy of this communication, which has been this day received, is respectfully forwarded herewith for transmission to the honorable the Secretary of War.

I have the honor to be, sir, very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

To the honorable the SECRETARY OF THE INTERIOR.

[Second inclosure.]

CHEYENNE RIVER AGENCY, D. T.,
February 12, 1876.

SIR: I have the honor to report the return on yesterday of one of the delegations sent from this agency some time ago to the camps of Sitting Bull and other wild bands, to invite them to come on the reservation or be considered enemies.

From the statements of these messengers, the "hostile" Indians received the above invitation and warning in good spirit, and without any exhibition of ill-feeling. They answered that, as they were now engaged in hunting buffalo, they could not conveniently accept my invitation at present, but that early in the spring they will visit this agency to dispose of their robes and skins, when the question as to their future movements can be thoroughly discussed. They are now camped on the Yellowstone River, and my informants say they are not only peaceably inclined, but deny the statements, so extensively circulated, that they intended to make war on the frontier on the approach of spring.

I cannot determine how much importance to attach to this information, but, until something transpires to convince me that hostile movements are intended, I must adhere to my present opinion that there is no danger to be apprehended.

Very respectfully, your obedient servant,

H. W. BINGHAM,
United States Indian Agent.

Hon. J. Q. SMITH,
Commissioner Indian Affairs, Washington, D. C.

Copy referred from Adjutant-General's Office to General of the Army, February 29, 1876.

[Copy telegram.]

SAINT PAUL, MINN.,
December 24, 1875.To ADJUTANT-GENERAL DIVISION MISSOURI,
678 Michigan Avenue, Chicago, Ill.:

Captain Poland telegraphs that, though there is no game in that vicinity, the Indians at Standing Rock are selling all their hides for ammunition. These Indians are closely connected with Sitting Bull's band, and, having in view the recent conversation of the Lieutenant-General with me, and the communication from the Interior Department to the War Department, which was referred to me on the 20th instant, I have ordered Poland to put a stop to such sales. I suggest that the Interior Department be requested to give similar orders to the traders.

TERRY,
Commanding Department.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, December 26, 1875.

Respectfully forwarded through headquarters of the Army.

P. H. SHERIDAN,
Lieutenant-General Commanding.

[Second indorsement.]

HEADQUARTERS OF THE ARMY,
Saint Louis, December 28, 1875.

Respectfully forwarded to the Secretary of War.

W. T. SHERMAN,
General.WAR DEPARTMENT,
WASHINGTON CITY, January 6, 1876.

SIR: I have the honor to transmit herewith, for your information, copy of telegram from the commanding general Department of Dakota, stating "that, though there is no game in that vicinity, the Indians at Standing Rock are selling all their hides for ammunition," and Captain Poland has been directed to stop such sales.

It is respectfully suggested that the Department of the Interior give similar orders to traders.

Very respectfully, your obedient servant,

H. T. CROSBY, Chief Clerk,
For the Secretary of War, in his absence.

To the honorable the SECRETARY OF THE INTERIOR.

[Copy telegram.]

STANDING ROCK, December 31, 1875.

To ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.:

Trader refuses to stop the sale of ammunition entirely. Announces he will sell on orders of Indian agent. Agent has refused to say he will not issue orders for ammunition. Will place a guard over store to-morrow morning. Documents by mail. I await further instructions.

J. S. POLAND.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, January 3, 1876.

Official copy respectfully forwarded to headquarters Military Division
of the Missouri for the information of the Lieutenant-General.

ALFRED H. TERRY,
Brigadier-General Commanding.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, January 5, 1876.

Respectfully forwarded through headquarters of the Army for the
information of the Indian Bureau.

P. H. SHERIDAN,
Lieutenant-General Commanding.

[Second indorsement.]

HEADQUARTERS OF THE ARMY,
Saint Louis, January 6, 1876.

Respectfully forwarded to the Secretary of War.

W. T. SHERMAN,
General.

WAR DEPARTMENT,
Washington City, January 12, 1876.

SIR: I have the honor to transmit for your information copy of a telegram dated the 21st ultimo, from the commanding officer of Standing Rock, stating the trader there refuses to stop the sale of ammunition entirely, and that the agent has refused to say he will not issue orders for ammunition, and that he, Captain Poland, will place a guard over the store.

Very respectfully, your obedient servant,

H. T. CROSBY, *Chief Clerk,*
For the Secretary of War, in his absence.

To the Hon. SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Washington, January 17, 1876.

SIR: Referring to two letters, dated, respectively, the 6th and 12th instant, from the War Department, upon the subject of sale of ammunition to Indians at Standing Rock agency, Dakota, I have the honor to respectfully invite your attention to the inclosed copy of a letter, dated the 14th instant, from the Commissioner of Indian Affairs, to whom the subject was referred, showing the action taken by that officer in the premises.

I have the honor to be, very respectfully, your obedient servant,
Z. CHANDLER,
Secretary.

The honorable the SECRETARY OF WAR.

[First inclosure.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., January 14, 1876.

SIR: I have the honor to acknowledge the receipt, by reference from the Department, of two letters from the War Department, dated, respectively, 6th and 12th instant, relative to the selling by Indians at Standing Rock agency of all their hides, for ammunition, and to the action of the military in ordering that such sales be stopped, and also in regard to the action of the United States agent and licensed trader at the agency concerning the selling of ammunition to the Indians.

Many of the Indians referred to are, doubtless, as stated in an inclosure in one of the communications from the War Department, closely connected with the hostile band under Sitting Bull, and the wisdom of the policy of selling to them ammunition, in view of that fact, is questionable. Being of the opinion that the sale of arms and ammunition to the Indians at Standing Rock agency should for the present be stopped, this office yesterday telegraphed to Agent Burke to that effect, and to-day, by letter, more fully instructed him on that point, and also in reference to the trader at his agency. A copy of that letter is herewith transmitted.

The letters from the War Department referred to are herewith returned.

Very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

The honorable the SECRETARY OF THE INTERIOR.

[Second inclosure.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
Washington, D. C., January 14, 1876.

SIR: Yesterday a telegraphic dispatch was sent to you to "stop sales of arms and ammunition to your Indians." Quite a large number of Indians at your agency are, it is said, closely connected with Sitting Bull's band. It is not deemed prudent, in view of that chief's hostile disposition and course, to allow his people to be supplied with the means of making further trouble. The Department is advised, through the War Department, that the Indians at your agency are selling all their hides for ammunition, and that Captain Poland has been directed to stop such sales. It may be suspected that mischief is intended by the Indians, and as a precautionary measure the order of the military is doubtless a proper one.

In this connection, your attention is called to the fact that no trader can sell arms and ammunition to the Indians of your agency, without a permit from this office. A copy of the rules and regulations of the Department in regard to the matter were sent to your predecessor, and ought to be on file at the agency. There is but one licensed trader at Standing Rock agency, Z. R. Casselberry, the term of whose license has just expired; and if he has been trading, having no permit, in arms and ammunition, it has been in violation, unwittingly, perhaps, on his part, of the rules and regulations in question.

As you may not have found on file a copy of the rules and regulations referred to, one is herewith transmitted.

If Mr. Casselberry proposes to continue trading with your Indians, he should at once apply to you for a new license, or a renewal of the old one; and if the application be granted by you, the papers necessary in the case should be immediately forwarded to this office for proper action thereon.

Very respectfully, your obedient servant,

J. Q. SMITH,
Commissioner.

JOHN BURKE, Esq.,
United States Indian Agent, Standing Rock, Dak.

[Second indorsement.]

WAR DEPARTMENT, ADJUTANT-GENERAL'S OFFICE,
Washington, January 25, 1876.

Respectfully referred, through headquarters of the Army, to the commanding general Department of Dakota, for his information. To be returned.

By order of the Secretary of War.

E. D. TOWNSEND,
Adjutant General.

[Third indorsement.]

HEADQUARTERS OF THE ARMY,
Saint Louis, January 29, 1876.

Respectfully transmitted, through headquarters Division of the Missouri.

By command of General Sherman.

WM. D. WHIPPLE,
Assistant Adjutant-General.

[Fourth indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, February 2, 1876.

Respectfully submitted to the commanding general, Department of Dakota.

By command of Lieutenant-General Sheridan.

R. C. DUNN,
Assistant Adjutant-General.

[Fifth indorsement.]

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., February 4, 1876.

Respectfully referred to the commanding officer, Standing Rock agency, D. T., for his information.

Please note and return.

By command of Brigadier-General Terry.

GEO. D. RUGGLES,
Assistant Adjutant-General.

[Sixth indorsement.]

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, D. T., February 18, 1876.

Respectfully returned. Contents noted.

J. S. POLAND,
Captain Sixth Infantry, Commanding.

[Seventh indorsement.]

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., March 6, 1876.

Respectfully returned, through headquarters Military Division of the Missouri. Contents noted.

ALFRED H. TERRY,
Brigadier-General, Commanding.

[Eighth indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, March 10, 1876.

Respectfully returned to the Adjutant-General through headquarters of the Army.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

[Ninth indorsement.]

HEADQUARTERS OF THE ARMY,
Saint Louis, March 13, 1876.

Respectfully forwarded, by command of General Sherman.

W. D. WHIPPLE,
Assistant Adjutant-General.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 30, 1875.

SIR: In compliance with your telegraphic order dated December 24, 1875, to forward by mail statements of facts and depositions of witnesses, I have the honor to submit the following: That my telegram was based on a notorious fact, and the hearsay evidence of Indians, which fact is not denied by the trader. (See his letter of December 29, 1875.)

Until the order stopping the sale of ammunition was received and communicated to the Indians, it was not difficult to obtain satisfactory information in regard to this trade. But now their suspicions are excited and they have become reticent. Some few prominent men have talked freely with me and their statements are here recorded.

On the 28th ultimo I had interviews with Bad Hand, a chief of the Uncapapas, and John Grass, a chief of the Blackfeet Sioux, to the probable truth of which my interpreter, Mr. E. H. Allison, has made affidavit.

Two Bears, one of the leading men is interpreted as saying that

"His young men had bought all the cartridges they wanted at the trader's, *i. e.*, Mr. J. R. Casselberry's; a number of Indians had bought cartridges to trade with the hostiles; his men had not; the hostile camp is about one hundred miles from here; some lodges had gone out to hostile camp to trade ammunition and annuity goods; an Uncpapa Indian only December 27th apologized to Mrs. Galpin, an Uncpapa woman, engaged in Indian trade, for not bringing his hides to her for sale, because he could buy cartridges at the trader's, which he wanted to take to the hostile camp and trade for furs."

Osica, Bad Wound, states he bought center-primed cartridges, caliber .50, at trader's by the box, 20 in a box, at \$1 per box. He has bought cartridges at different times, and has seen other Indians buy ammunition at the same place."

Bad Hand (a watchman at the agency, he calls himself) came to my office, seeking an interview in reference to a false report of an arrest by the military of an Indian. He stated, "four lodges left for the hostile camp about four weeks ago. He had received (from the winter killing of beeves) ten hides. They get from the trader four one-dollar tickets; for these they get anything they want in the store. They get fifty rounds of ammunition and one dollar in goods for four tickets. Until the order stopping the sale of ammunition, he bought for his tickets nothing but ammunition. Before they raised the price of hides, (NOTE.—Lately, as a special inducement, the trader promised to pay \$4 instead of \$3 and $\frac{1}{2}$ per hide,) they got fifty cartridges for two dollars and a half; since they raised the price (of hides) they get fewer cartridges for the same money. Anybody can get cartridges. Cartridges are all the same price to chiefs and private individuals. The trader sells a great many. That is the reason why Mrs. Galpin, who does not sell ammunition, does not get more hides. The trader published it vigorously at the killing of beef that he would sell them ammunition; this is the inducement he offers to secure hides. The agent has been trying to get Indians to go out and invite (meaning induce) Sitting Bull to come into this agency, but has not succeeded yet. (NOTE.—This is true. (Signed) Poland.) He, Bad Hand, will go to bring Sitting Bull in, provided the whites will not make an expedition into that country in the spring or summer. In the trade with hostiles, ammunition is the grand thing; their trade is different from the white man's. Indians go out and make presents of annuity-goods, ammunition, and sugar and coffee to the hostiles, who load them down in return with furs. Indians from this agency make more or less trips to the hostile camp. The hostiles get in this way arms and ammunition from a number of points from agencies and traders above here."

Since this statement was made a soldier informed me that Bad Hand voluntarily told him he was coming to see me and tell me that he had overheard a party of young men, Uncpapas and Blackfeet, planning to leave for the hostile camp in four or five days, after having first stolen horses and mules from the Government corral at this post. That Bad Hand did not tell me may be explained. During the interview we were not alone at any one time, and he feared witnesses might tell his people whatever he communicated.

John Grass, a chief of the Blackfeet Sioux, in his interview with me on the 28th, said: "Hostile Indians coming to this agency are distributed among the Indians themselves, or attached to the several bands. Rations are divided among them after they are drawn from the agent; beef-hides are similarly divided. They sell them at the traders' and get what cartridges they want. The hostiles who came to this agency under Gaul,

last spring, have done this. (NOTE.—I know that Agent Palmer counted their lodges, and I believe thereafter issued rations to Gaul for eighteen to twenty lodges, and neither Gaul nor the majority of his band are now here. (Signed) Poland.) This party will all of them join Sitting Bull when the winter breaks up. Indians have been allowed to purchase cartridges at the store. Many are engaged in this trade or exchange of presents with the hostile camp. Were it not for the privilege of buying cartridges at the store (meaning J. R. Casselberry's) a great many more beef-hides would be sold at Mrs. Galpin's by Indians."

Respecting the probable truth of the foregoing statements, I invite attention to the affidavit of the interpreter, and will add that there are no more reliable men among the Sioux than the three chiefs named. It is only necessary to refer to the correspondence hereto attached (part original and part official copy) to discover evidence showing that this trade has been conducted under a general authority, and not under the close personal control of the agent. The agent chooses to say that the bulk of the cartridges sold by the trader to Indians was expended in killing their beef. It is impossible for me to obtain access to the trader-account with the agent, which I firmly believe will show that the agent bought, with contingent fund or Government funds, every cartridge so used; and I am confirmed in this belief by the fact that at one killing of beef which occurred here last summer, the agent's son, then acting agent, bought the cartridges himself, and took them in a sack to the beef-corral.

If such were the only sale of ammunition to Indians, the trader would certainly not get one-tenth of the hides he now purchases, and which are now sold to *him*, because from him *cartridges* can be obtained.

I here submit an item which will, perhaps, show how extensive this trade might be. Six thousand beeves are supposed to be sent to this agency annually, yielding 6,000 hides. The trader pays for each hide, say, 50 rounds of ammunition. Deduct, say, one-half for hides sold to Mrs. Galpin; then $3,000 \times 50 = 150,000$ (one hundred and fifty thousand) rounds of ammunition would correctly represent the total sales. I am of the opinion, however, that 100,000 (one hundred thousand) rounds of ammunition is nearer the total of his annual sales. If we suppose that 25 per cent. of this amount is taken out to Sitting Bull for trade, and a proportional amount from other agencies, can we wonder how the hostiles procure arms and ammunition? Mrs. Galpin informed me that a chief, "Little Wound," left this agency about three weeks ago for the hostile camp, and boasted of the amount of ammunition he had to take out with him.

Respectfully inviting attention to the accompanying correspondence,
I remain, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

N. B.—December 30, 9 o'clock p. m. I have not yet received an answer to my letter, (see Exhibit "N.") When received, if I find my request denied, I shall then deem it *necessary*, and place a guard over the store, and report the fact by telegraph immediately.

Very respectfully, &c.,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

H. Ex. 184—3

A.

Personally appeared before me E. H. Allison, this 30th day of December, 1875, who, being duly sworn, deposes and says that the statements of Two Bears, a chief of the Yanktonnais Sioux, Bad Hand, of the Uncpapa, John Grass, of the Blackfeet Sioux, and Osica, of Standing Rock Agency, as herein reported by Capt. J. S. Poland, Sixth Infantry, are and have been truly and correctly interpreted by him, and that he believes said statement to have been truthfully made, and with no intent to deceive either himself or Capt. J. S. Poland, Sixth Infantry, and to the best of his knowledge he believes the same to be true.

E. H. ALLISON.

Sworn and subscribed to this the 30th day of December, 1875, before me, S. S. Turner, a notary public for the Territory of Dakota, at Standing Rock Agency, Dak.

[SEAL.]

S. S. TURNER,
Notary Public.

B.

[Correspondence with J. R. Casselberry.]

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 26, 1875.

SIR: Orders this day received from headquarters Department of Dakota direct me to "stop the sale of ammunition to Indians" by you or your agents at this agency. You are herein respectfully notified of this order, and that strict compliance with it will be demanded and enforced.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.
Messrs. J. R. CASSELBERRY & Co.,
Traders.

A true copy :

GEO. B. WALKER,
Second Lieutenant Sixth Infantry, Post-Adjutant.

C.

STANDING ROCK INDIAN AGENCY, DAK.,
December 27, 1875.

SIR: I have the honor to acknowledge the receipt of your communication of yesterday, notifying me that you had that day received orders from headquarters Department of Dakota, directing you to stop the sale of ammunition to Indians by myself or agents at this agency, and notifying me that a strict compliance with it would be demanded and enforced. In reply, I would respectfully state that I am a licensed trader, holding my appointment from the United States Indian Department, and expect to receive orders concerning my business through said Department, the lawful orders and instructions of which I am at all times ready and willing to obey, on this or any other proper subject.

Relative to the sale of ammunition to Indians, by myself or agents, I respectfully refer you to the United States Indian agent at this agency for information.

I would also respectfully request an official copy of the order from department headquarters, to which your communication refers, fully recognizing the authority of the War Department (the Interior Department concurring) through the general commanding the Department of Dakota in all matters relating to my business as a licensed Indian trader.

Very respectfully, your obedient servant,
J. R. CASSELBERRY,
Trader,
Per H. S. PARKIN.

Col. J. S. POLAND,
Commanding Military Station, Standing Rock, Dak.

D.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 27, 1875.

SIR: I have the honor to acknowledge the receipt of your communication of this date, and in connection therewith and to remove the doubts in my mind of your intention, originated by your letter, I respectfully request a specific answer to this question: Do you intend to stop selling ammunition to Indians, in compliance with the order contained in my communication of December 26, 1875?

Very respectfully, your obedient servant,
J. S. POLAND,
Captain Sixth Infantry, Commanding.

Mr. J. R. CASSELBERRY, *Trader,*
Care of Mr. H. S. Parkins.

A true copy.

GEO. B. WALKER,
Second Lieutenant Sixth Infantry,
Post-Adjutant.

E.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 29, 1875.

SIR: You were respectfully notified December 26, 1875, of the order received from headquarters, Department of Dakota, that day, to "stop the sale of ammunition to Indians," and that strict compliance with that order would be enforced. As a point of courtesy to you I submitted the inquiry, necessitated by your communication of December 27, for your determination: Do you intend to stop selling ammunition to Indians, in compliance with the orders contained in my communication of December 26, 1875?

I have received no reply to that question. If a specific answer is not returned to this headquarters by 1 o'clock, p. m., this day, I shall be forced to the conclusion that you do not intend to return an answer to the question, and that you do not intend to stop the sale of ammunition to

Indians; and further, by your action in this matter, I shall be compelled to execute the orders specially directed to me to secure obedience to that order.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.
 Mr. J. R. CASSELBERRY, *Trader.*

F.

STANDING ROCK INDIAN AGENCY, DAK.,
December 29, 1875.

SIR: I have the honor to acknowledge the receipt of your communication of this date, and also the communication to which it refers. In reply, I am under instructions to obey no orders relative to my business except such as emanates from the Interior Department, properly transmitted through the Indian agent in charge of this agency. I will say for your information that I have not sold any ammunition to Indians since the date of your first communication, (the 26th instant,) nor do I intend to do so except upon orders received over the signature of the United States Indian agent at this agency, whose authority alone I recognize, as paramount to that of all other authority on this reservation, so far as the same pertains to my business.

Very respectfully, your obedient servant,

J. R. CASSELBERRY,
Trader,
 Per H. S. PARKIN.

Col. J. S. POLAND,
Commanding Military Station, Standing Rock, Dak.

Correspondence of the Indian agent in reference to the traders stopping the sale of ammunition:

G.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 26, 1875.

SIR: I have the honor to inclose a copy of a letter to Messrs. J. R. Casselberry & Co., traders, containing notification of order received from commanding general, Department of Dakota, to "stop the sale of ammunition to Indians."

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.
 Col. JOHN BURKE,
United States Indian Agent.

A true copy.

GEO. B. WALKER,
Second Lieutenant Sixth Infantry, Post-Adjutant.

H.

UNITED STATES INDIAN AGENCY,
Standing Rock, Dak., December 27, 1875.

SIR: I have the honor to acknowledge the receipt of your communication of the 26th instant, inclosing a copy of a letter from you, addressed to J. R. Casselberry, trader at this agency, relative to sale of ammunition to Indians.

In reply, I have to inform you that Mr. Casselberry is a licensed trader, holding his appointment under the United States Interior (Indian) Department, in pursuance of law and regulations, and, consequently, required to obey the proper orders of said Department, all orders emanating from any other Department of the Government pertaining to his business or conduct on this reservation to the contrary notwithstanding.

Relative to the sale of arms and ammunition to Indians, proper regulations and orders have long since been promulgated by the Interior Department, (the War Department concurring,) regulating the same within the jurisdiction of Indian reservations and otherwise, by licensed traders; all of which orders the trader at this agency is fully aware of and required to faithfully observe.

The orders and regulations above referred to were made in pursuance of acts of Congress, particularly the "acts of Congress making appropriations for the Indian Department, and for fulfilling treaty stipulations with Indian tribes," approved February 14, 1873, to all of which your attention is respectfully invited for information as to the authority of one Department of the Government, its officers or agents, in any manner whatever interfering with the properly delegated authority and jurisdiction of another Department of the Government, or with its officers and agents.

In conclusion, say that I desire to co-operate with all proper authority for the enforcement of the intercourse laws of the United States, and any assistance that I can give in the premises will be promptly rendered.

In this connection I would respectfully inform you that I have reason to believe there is a trading establishment at Beaver Creek engaged in selling ammunition to Indians, and as I have no jurisdiction over the parties on account of their location being outside of the boundaries of this reservation, refer the matter to you, promising at the same time my cheerful co-operation for the suppression of such business.

I am, sir, very respectfully,

JOHN BURKE,
United States Indian Agent.

Col. J. S. POLAND,
Commanding Military Station, Standing Rock, Dak.

I.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 27, 1875.

SIR: In a communication this day received from H. S. Parkins, business manager of J. R. Casselberry, trader, I am referred in words as follows: "Relative to the sale of ammunition to Indians by myself or agents, I respectfully refer you to the United States Indian agent at

this agency for information." Relative to the sale of ammunition, I respectfully request you to inform me if the trade has been authorized by a general permit to sell to Indians, and for any special article, as, for instance, the hides derived by them from the slaughter of beef-cattle, or whether the trader is prohibited from selling ammunition except upon individual orders or permits. This information is respectfully requested of you, since the trader's letter tends to shift the responsibility and authority for such sale to the United States Indian agent.

Under section 2136, Revised Statutes United States, it is supposed there are regulations prescribed governing such trade at this agency.

I have the honor to be, very respectfully, your obedient servant,

J. S. POLAND,

Captain Sixth Infantry, Commanding.

Col. JOHN BURKE,

United States Indian Agent, Standing Rock, Dak.

A true copy :

GEO. B. WALKER,

Second Lieutenant Sixth Infantry, Post-Adjutant.

K.

STANDING ROCK, *Dak.*,

December 28, 1875.

SIR : In reply to your communication of yesterday relative to the sale of ammunition to Indians, I have to inform you that Mr. Casselberry was properly authorized to trade with the Indians of this agency by the honorable Commissioner of Indian Affairs, direct, on the 13th of January, 1875, and gave the required bonds for the faithful observance of the intercourse-laws of the United States, and the rules and regulations of the United States Interior Department.

Relative to the authority authorized to regulate the sale of arms or ammunition to Indians, I respectfully refer you to the following extract of General Orders No. 4, headquarters Middle District, (Department of Dakota,) dated Fort Sully, Dakota Ter., November 21, 1872, which reads :

"In accordance with instructions from the Commissioner of Indian Affairs, concurred in by the Secretary of War, General Orders from headquarters Middle District, Fort Rice, Dakota Ter., dated September 3, 1872, is hereby so modified as to place the responsibility for the sale of arms and ammunition to Indians, or whites living at agencies, upon the Indian agents.

"Agents are authorized to permit trade in ammunition and arms only to Indians known to be friendly, and in small quantities.

* * * * *

"By order of Col. D. S. Stanley :

"H. H. KETCHUM,

"First Lieutenant and Adjutant Twenty-second Infantry,

"Assistant Adjutant-General.

"INDIAN AGENT,

"Grand River Agency."

The several communications from the Hon. Commissioner of Indian Affairs of September 10, 1873, March 31, 1874, and May 11, 1874, to my predecessor are substantially the same as contained in the foregoing

orders, so far as pertains to regulating the sale of arms and ammunition is concerned, with the additional instructions as to the limit which to require traders to keep in selling the same to Indians.

On this point I refer you to the following extract from the Commissioner's letter of May 11, 1874, which reads as follows :

"You are instructed to advise the trader or traders * * * that their sales of the same (meaning arms and ammunition) will be limited by you to such extent as shall be deemed sufficient for the necessities of the Indians."

He also makes reference to circular-letter of March 31, 1874, which is substantially the same.

I find that in pursuance of the several regulations and instructions above mentioned that my predecessor had regulated and restricted the sale of ammunition by J. R. Casselberry, trader, to the lowest possible limit, and required him to comply with the sixth section of the rules and regulations of the Department of the Interior by making monthly reports at the close of each month of his sales of arms and ammunition sold to Indians during the month.

Since assuming charge of this agency I have received no information that there has been any change in the orders and instructions herein referred to, and have accordingly permitted Mr. Casselberry to continue trading, as authorized by my predecessor, requiring him, however, to sell only to Indians residing permanently on this reservation and known positively to be friendly and peaceable. He is now trading in pursuance of said authority, without any reference as to what special articles he shall the same to Indians for, although I know that nearly all of the ammunition sold by him is now and has been expended in the slaughter of beef-cattle for this agency. His monthly reports of the sale of ammunition to Indians have been properly made and forwarded to the Commissioner of Indian Affairs, as required by regulations.

Relative to your orders to Mr. Casselberry, (copy of which I received inclosed in your communication of the 26th instant,) I have to respectfully inform you that his instructions and that of his agents are to receive no instructions or orders from any authority, pertaining to his business as trader, not emanating from or concurred in by the Department of the Interior, and transmitted through the United States Indian agent at this agency.

I am, sir, very respectfully,

JOHN BURKE,
United States Indian Agent.

Col. J. S. POLAND,
Commanding Military Station, Standing Rock, Dak.

L.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 28, 1875.

SIR : I have the honor to acknowledge the receipt of your communication of December 27, 1875, and to respectfully invite your attention to my note of same date asking for certain information therein indicated.

I further respectfully request you to furnish me, at your earliest convenience, with depositions or affidavits of credible witnesses, or any reliable testimony on which you base your belief that a trading establishment at Beaver Creek is engaged in selling ammunition to Indians.

Like information in relation to any parties at any ranch of having sold or of now selling ammunition will be thankfully received.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry.

Col. JOHN BURKE,
United States Indian Agent.

True copy :

J. S. POLAND,
Captain Sixth Infantry.

M.

STANDING ROCK, DAK., *December 28, 1875.*

SIR: Your communication of this date received and contents noted. The information which your note of yesterday (5 p. m.) called for has been furnished this morning.

In this connection I have to inform you that all official communications received from your headquarters, or any other public source, shall receive attention from me at the earliest possible moment.

In compliance with your request, I inclose herewith complaint against parties at Beaver Creek, who are charged with selling ammunition to an Indian named White Horse without proper authority. These parties are now and have been engaged in this business for some time, and are, as I am informed, also engaged in selling liquor to Indians. This I am not able to prove.

M^l.

Complaint.

UNITED STATES OF AMERICA, *3d district of Dakota, ss :*

The information and complaint of James Rourke, of Standing Rock, Dak., in said district, taken on his oath before John Burke, United States Indian agent, Standing Rock agency, Dakota, the 28th day of December, A. D. 1875, who, upon his said oath, says he has just and reasonable ground to suspect and believe that A. A. Dickey, Augustus Gelbraith, and — Archambault, on or about the 27th day of December, A. D. 1875, at Beaver Creek, Dak., within the 3d district of Dakota aforesaid, and within the jurisdiction of the United States district court for said district of Dakota, did, on the 27th day of December, A. D. 1875, sell ammunition to an Indian named White Horse, to wit, one hundred rounds of fixed ammunition, for the sum of five dollars in United States currency. All this at Beaver Creek, in said district, contrary to the statutes of the United States in such cases made and provided; and further saith not.

JAMES ROURKE,
Complainant.

Subscribed in my presence, and sworn to before me, at Standing Rock, Dak., this 28th day of December, A. D. 1875.

JOHN BURKE,
United States Indian agent, Standing Rock, Dak.

The date charged in this complaint is only a matter of legal formality, but the facts stated are true; and further, as to the sale of ammunition

both prior and subsequent to the date charged, it is safe to say such can be proved beyond any possibility of doubt.

The witnesses to these charges are James Rourke, Lawrence Brown, White Horse, Medicine Man, Kill Eagle, and Caddy.

I remain, sir, very respectfully,

JOHN BURKE,
United States Indian Agent.

Col. J. S. POLAND,
Commanding Military Station, Standing Rock, Dak.

N.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 29, 1875.

SIR: Mr. J. R. Casselberry having announced to me, this date, that he has not sold ammunition to the Indians since the receipt of the order to stop the sale, and that he will not sell except upon your orders, I therefore respectfully request that you will neither issue any general or special permits to Indians to buy, nor authorize the trader to sell or deliver ammunition to them, until further instructions are received. Please inform me as to what your action will be in reference to this request.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Bvt. Lieut. Col., U. S. A., Commanding.
Col. JOHN BURKE,
United States Indian Agent.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 31, 1875—1.30 p. m.

SIR: Since forwarding by scout preceding correspondence in relation to the sale of ammunition, I have received the inclosed letter and returned reply, a copy of which is also inclosed. Having exhausted amicable measures, I shall place a guard over the store, and keep it there until the trader promises to "stop unconditionally," or until further orders are received from Department headquarters in reference to the sale of ammunition. I forward this by scout, to reach the mail to-morrow morning at Fort Rice, and by the same scout a telegram, of which the following is a true copy:

"STANDING ROCK, *Dak., December 31, 1875.*

"ASSISTANT ADJUTANT-GENERAL,

Department of Dakota, Saint Paul, Minn. :

"Trader refuses to stop the sale of ammunition entirely. Announces he will sell on orders of Indian agent. Agent has refused to say he will not issue orders for ammunition.

"Will place a guard over store to-morrow morning. Documents by mail. I wait further instructions. "POLAND."

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

STANDING ROCK, DAK.,
December 30, 1875.

SIR: Your communication of yesterday received, relative to Mr. Caselberry's action and intentions in the matter of the sale of ammunition to Indians, and requesting me not to issue any permits nor authorize the trader to sell or deliver ammunition to them until further instructions are received, and also wishing to be informed as to what my action will be in reference to this request.

In reply, I am entirely at a loss to divine what you are seeking to accomplish, and from what source you derive your pretended authority to question me as to what my action will be on this or any question touching my official duty.

There has been a great deal of unnecessary correspondence on this subject, all of which might have been avoided by a proper observance of the rules recognized by all Departments of the Government in transmitting official orders, instructions, and requests through the proper intermediate channels.

As to what my action will be in relation to your request, I have to inform you that such action will be taken by me as my instructions from my Department prescribe, and where any discretion is left me outside of such instructions, I shall be governed wholly by the requirements, customs, and exigencies of the Indian service, without allowing or permitting any intermeddling with me in the lawful discharge of my duties as an Indian agent.

I desire to say for your information, however, that the War Department, nor any authority subject to orders emanating therefrom, and have no fears that what little authority I possess as an Indian agent will be used to endanger the peace of the country, or to furnish arms or ammunition to public enemies, or those who are or may be suspected of being in league therewith.

I am, sir, very respectfully, your obedient servant,

JOHN BURKE,
United States Indian Agent.

Col. J. S. POLAND,
Comdg. Military Station, Standing Rock, Dak.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., December 31, 1875.

SIR: Your communication of December 30, 1875, is received. I have the honor to reply that you were informed in my letter of December 26, 1875, of the object I sought to accomplish, and also very plainly from whom the order came, viz, the commanding general Department of Dakota.

You have not indicated to me in your letter that you will aid me in securing obedience to the department commander's order by refusing the permits or orders upon which the trader announces that he will continue the sale of ammunition to Indians, the orders of the commanding general of this department to the contrary notwithstanding.

My orders are peremptory, and shall not ask further assistance even to avoid a resort to the summary measures ordered by the general commanding.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

Col. JOHN BURKE,
United States Indian Agent.

*Indorsements forwarding communications of December 30 and 31, 1875,
from Captain Poland.*

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., January 15, 1876.

Respectfully forwarded to the headquarters of the Military Division of the Missouri, in connection with my telegraphic report of the 24th ultimo, that I had directed Captain Poland to prevent the sale of cartridges at the Standing Rock agency.

ALFRED H. TERRY,
Brigadier-General, Commanding.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, January 25, 1876.

Respectfully forwarded to the Adjutant-General through headquarters of the Army.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

HEADQUARTERS OF THE ARMY,
Saint Louis, January 26, 1876.

Respectfully forwarded to the Secretary of War.

W. T. SHERMAN,
General.

WAR DEPARTMENT,
Washington City, February 7, 1876.

SIR: I have the honor to transmit herewith for your information copy of correspondence between the commanding officer of the United States military station at Standing Rock Indian agency and the Indian agent at that point, relative to the suppression of the sale of arms and ammunition to the Indians of said agency.

Very respectfully, your obedient servant,

W. W. BELKNAP,
Secretary of War.

HON. SECRETARY OF THE INTERIOR.

HEADQUARTERS FORT STEVENSON, DAK.,
January 15, 1876.

SIR: In compliance with General Orders No. 19, headquarters Department of Dakota, Saint Paul, Minn., March 6, 1875, I have the honor to inclose communications received from the Indian agent at Fort Berthold, D. T., under dates of January 12 and 13, in regard to the movements of supposed hostile Indians. From the fact that these Indians were poorly supplied with horses and ammunition, and that their arms were of a very old pattern, and also from the fact that when they withdrew they started in the direction of Turtle Mountain, I do not agree with Agent Darling that they were Uncapapa Sioux, but am of the

opinion that they were straggling Indians from near the northern boundary. It is well known that Sitting Bull is well supplied with ponies, and that he has, during the past year, given a great many to the Gros Ventres.

Very respectfully, your obedient servant,

DAN. HUSTON,
*Lieutenant-Colonel Sixth Infantry,
 Brevet Colonel U. S. A., Commanding.*
 ASSISTANT ADJUTANT-GENERAL,
Department Dakota, Saint Paul, Minn.

ARICKAREE, GROS VENTRE, AND MANDAN AGENCY,
Fort Berthold, Dak., January 12, 1878.

COLONEL: I am just informed by Bloody Knife that a large band of hostile Sioux ran off all the Gros Ventre horses last night, and that the Rees, Gros Ventres, and Mandans have started in pursuit this morning. The Gros Ventre camp is opposite the mouth of the Little Missouri River, and the Sioux are traveling in the direction of Turtle Mountain at the head of one of the forks of Big Knife River.

I am, colonel, very respectfully, your obedient servant,

C. W. DARLING,
United States Indian Agent, &c.
 Lieut. Col. DANIEL HUSTON, Jr.,
Sixth Infantry, Commanding Fort Stevenson, Dak.

ARICKAREE, GROS VENTRE, AND MANDAN AGENCY,
Fort Berthold, Dak., January 13, 1876.

DEAR SIR: I have the honor to state that I have this day visited the winter-quarters of some of the agency Indians, to get at the truth of the reports I wrote you about this morning. I learned that the party (twenty to thirty of hostile Indians) drove off from the Gros Ventre winter-quarters 25 ponies; were followed by a party of Gros Ventres and Mandans, they recapturing two ponies and killing four Sioux. (I saw the scalps.) I was unable to learn what band they belonged to, but all the signs point to the Uncapapas, under Sitting Bull. My reasons for thinking so are these: First. After taking the ponies they started up the river, and kept in that direction until overtaken. Second. Some of the party were on foot. Third. Had all old guns, or at least the four guns captured were old, and had not been fired lately; no ammunition, probably. The lower agency Indians would not have gone far up the river, would have been on their horses and had good guns and plenty of ammunition. In any event, think some one will have to pay for the four scalps before spring. Shall try and be prepared for the worst, as far as we are able, here. Will inform you of anything new.

In mean time I remain, very respectfully, your obedient servant,

C. W. DARLING,
United States Indian Agent.
 Lieut. Col. DANIEL HUSTON, Jr.,
*Sixth United States Infantry,
 Commanding Fort Stevenson, Dak.*

ARICKAREE, GROS VENTRE, AND MANDAN AGENCY,
Fort Berthold, Dak., January 13, 1876.

DEAR SIR: I have the honor to state that the large party (as represented by Bloody Knife and sent you by Mr. C. yesterday) of hostile Sioux turned out to be some six or eight, who succeeded in running off some twenty or thirty ponies from the Gros Ventre winter-quarters. The report came in last night, and is confirmed this morning, that they were overtaken, one of them killed and one wounded, and most of the horses recaptured. Can't say how true this is. Will get at the facts in the case as soon as possible, and forward same to you.

I am, colonel, very respectfully, your obedient servant,
 C. W. DARLING,
United States Indian Agent.

Lieut. Col. DANIEL HUSTON, Jr.,
*Sixth United States Infantry,
 Commanding Fort Stevenson, Dak.*

HEADQUARTERS, FORT STEVENSON, DAK.,
January 15, 1876—8 o'clock p. m.

SIR: Immediately after sending my letter of this date, inclosing communications from the Indian agent at Fort Berthold, Dak., I visited that agency, and in conversation with Major Darling I find that the Turtle Mountain referred to in his letter is near the head of one of the forks of Big Knife River, on the south side of the Missouri, about twenty-five miles from Fort Berthold, and not, as I supposed, the Turtle Mountain on the northern boundary. He informed me that the Indians engaged in the fight tell him *most positively* that these Sioux were a part of Sitting Bull's band, and when overtaken they had been and were traveling in the direction of the Yellowstone River, where he (Sitting Bull) generally camps during the winter.

Major Darling has promised to furnish me with a detailed account of the stealing of these horses, of the fight, who these Sioux were, and all the particulars he can obtain; which report, as soon as received, I will forward.

Very respectfully, your obedient servant,
 DAN. HUSTON, JR.,
*Lieutenant Colonel Sixth Infantry,
 Brevet Colonel, U. S. A., Commanding.*

ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

HEADQUARTERS, FORT STEVENSON, DAK.,
January 16, 1876.

GENERAL: I received your communication of the 5th instant last evening, on my return from a visit to Fort Berthold. I immediately sent back to the agent a note, asking him to send me, in writing, all the information concerning Indians he had given me verbally during the day. Inclosed please find his reply.

Sitting Bull and his band removed from the Little Missouri some time ago, and from Bloody Knife, an old and reliable scout, I learn that there are at present no regular camps of hostile or other Indians on that

stream, although there may be a party or two, from six to ten each, temporarily hunting on it high up, however. Although I believe the above information in regard to there being no hostile Indians at present on the Little Missouri reliable, I shall go myself to Berthold to-morrow, and if I find there be any doubt in the matter, will endeavor to send a party up that stream to obtain the information you desire.

Concerning the fight mentioned in the inclosed letter, I think it proper to state here that Running Antelope, head chief of the Uncapapas at Standing Rock, with four of his tribe, came into this post to-day en route to Fort Berthold, to make a friendly visit to the Rees, with whom they last summer formed a treaty of peace and amity. On telling him of the fight, of which he had not before heard, and asking his opinion as to who he thought the marauders were, he replied that he believed, in fact was almost certain, they were a party of ten or twelve of Spotted Tail's band who he knew had been out nearly all winter, and were most of them on foot.

I am, general, very respectfully, your obedient servant,

DANL. HUSTON, JR.,

Lieut. Col. Sixth Infantry, Bvt. Col. U. S. A., Commanding.

Brig. Gen. ALFRED H. TERRY,

Commanding Department of Dakota, Saint Paul, Minn.

FORT BERTHOLD, DAK.,

January 16, 1876.

Lieutenant-Colonel DANL. HUSTON, Jr.,

Sixth United States Infantry, Commanding Fort Stevenson, Dak. :

I have your communication of the 15th, in which you state that after the interview with myself yesterday you have come to the same conclusion as I did with regard to the Sioux who committed the recent depredation at this agency being from Sitting Bull's camp. From the best information I can obtain his camp is at present located at Calf's Ear Butte, on the Yellowstone River, in an air-line about ninety to one hundred miles from Fort Buford. The best information obtainable puts his strength about 500 lodges, (as reported last fall.) With regard to the late fight between the party of hostile Sioux and the Indians of my agency, I would state that on the night of the 11th or morning of the 12th instant, about thirty head of horses were stolen by this party from the Gros Ventres winter-camp, opposite the mouth of the Little Missouri River, about twenty-five miles from the agency. A number of Gros Ventres and Mandans at once followed the Sioux and overtook a small party, who were afoot, at the head of Beaver Creek, a small stream which flows into the Missouri on the west side about eight miles above the agency. One of the Sioux was killed and another wounded at this point. The party of Gros Ventres and Mandans, being re-enforced, followed up the trail, which led to Turtle Mountain, which, as stated in communication of 12th instant, is situated at the head of one of the forks of Big Knife River, of course west of the Missouri River. This mountain is well known to all hunters and trappers, and is a favorite hunting-ground of the Rees. It is situated close to the Little Missouri River, about forty miles from Fort Berthold. The Sioux were evidently making for their camp on the Yellowstone River, and late in the night of the 12th the party of Fort Berthold Indians discovered about thirty of the Sioux in the Bad Lands on the other side of the Little Missouri River, and in the fight which ensued killed three Sioux and wounded

several more, recovering two of their stolen horses. That these Indians came from Sitting Bull's camp I believe, from the fact that for so far the treaty of peace effected last summer at Fort Lincoln with the Sioux of Standing Rock and Cheyenne agencies has not been broken, and also that Mr. Charles Reynolds reports on his arrival yesterday at the agency that he was within fifteen miles of Turtle Mountain, on the west side of the Missouri, having gone from the mouth of Big Knife River to that point, and no Indians from below had crossed the river on their way here, which they must have done had they been from Standing Rock or Cheyenne agencies. I think it will be next to impossible to get any of our Indians to go near Sitting Bull's camp at present; still, will do all I can to do so, and will inform you of the result. In mean time, anything new turning up, will keep you posted.

I am, very respectfully, your obedient servant,

C. W. DARLING,
United States Indian Agent.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., January 25, 1876.

Respectfully forwarded to headquarters Military Division of the Missouri, for the information of the Lieutenant-General commanding.

ALFRED H. TERRY,
Brigadier-General, Commanding.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, January 29, 1876.

Respectfully forwarded through headquarters of the Army.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

HEADQUARTERS OF THE ARMY,
Saint Louis, January 31, 1876.

Respectfully forwarded to the Secretary of War.

W. T. SHERMAN,
General.

WAR DEPARTMENT,
Washington City, February 8, 1876.

SIR: I have the honor to transmit herewith, for your information, copy of report of the commanding officer at Fort Stevenson, Dak., dated January 15, 1876, relative to the stealing of ponies from the Gros Ventre Indians, by hostiles, with speculations as to the identity of the hostile Indians, &c.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

Hon. SECRETARY OF THE INTERIOR.

CROW AGENCY, *Mont., January 10, 1876.*

SIR: I write a line in much haste to inform you that the reports that come to me make it evident that a considerable body of Sioux are in the

vicinity of the Big Horn. They seem to be scattered in small parties. Two white men have been killed by them near Fort Pease, lately, and another wounded.

A Crow who has just come in reports that they are moving in this direction.

The Crow Chief "Bear Wolf" tracked a party of eight to Fort Pease, came on to them as they were watching the place, and killed six or seven.

I am, very respectfully, yours,

DEXTER E. CLAPP,
Agent.

Major BENHAM,
Commanding Post, Fort Ellis.

[Indorsements.]

HEADQUARTERS, FORT ELLIS, MONT.,
January 20, 1876.

Respectfully forwarded to headquarters, Department of Dakota, (through headquarters District of Montana,) for the information of the Department and district commanders. A short time since I turned over to Agent Clapp a lot of arms and ammunition, by order of the Secretary of War, with which, in my opinion, they will be able to protect themselves at the agency.

D. W. BENHAM,
Captain Seventh Infantry, Commanding Post.

HEADQUARTERS DISTRICT OF MONTANA,
Fort Shaw, Mont. January 27, 1876.

Respectfully forwarded to headquarters Department of Dakota.
JOHN GIBBON,
Colonel Seventh Infantry, Commanding.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., February 11, 1876.

Respectfully forwarded to headquarters Military Division of the Missouri, for the information of the Lieutenant-General.

ALFRED H. TERRY,
Brigadier-General, Commanding.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, February 15, 1876.

Respectfully forwarded for the information of the General of the Army in the absence of the Lieutenant-General.

R. C. DRUM,
Assistant Adjutant-General.

WAR DEPARTMENT,
Washington City, February 21, 1876.

SIR: I have the honor to transmit herewith for your information copy of the report of Dexter E. Clapp, Indian agent at the Crow agency, Montana Territory, dated January 10, 1876, stating that parties of Sioux

are in the vicinity of Big Horn, two men killed, and one wounded, and that they are moving in the direction of the agency.

Very respectfully, your obedient servant,

WM. W. BELKNAP,
Secretary of War.

HON. SECRETARY OF THE INTERIOR.

[Telegram.]

HEADQUARTERS ARMY OF THE UNITED STATES,
Saint Louis, February 23, 1876.

The following just received from General Sheridan :

"The small band of citizens of Montana who settled upon the north bank of the Yellowstone, opposite the mouth of the Big Horn, at a point known as Fort Pease, has been attacked by Sioux Indians. All but fourteen abandoned the fort. The latter are besieged. General Terry has ordered Colonel Brisbin, commanding at Fort Ellis, to go without delay to relief. One man has been killed and two wounded. Fort Pease is distant from Fort Ellis about one hundred and eighty miles."

By command of General Sherman :

WHIPPLE,
Assistant Adjutant-General.

ADJUTANT-GENERAL, U. S. A.,
Washington, D. C.

[Telegram.]

SAINT PAUL, MINN., *March 15, 1876.*

ADJUTANT-GENERAL, *Division Missouri, Chicago :*

Following just received :

"Mouth of Big Horn, March 6, 1876. Arrived at Fort Pease March 4, and relieved garrison. Fort was evacuated to-day at noon. Original garrison consisted of forty-six men, of whom six were killed and eight wounded. Thirteen had left and gone to settlements by night. I found in fort eighteen white men and a negro, and have brought them away. Saw no Indians, but found five war-lodges here of about sixty Sioux, who fled south ; think they were watching fort to pick up men who ventured out. We start for home to-morrow.

"BRISBIN, *Commanding.*"

TERRY,
Commanding Department.

[Indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, March 17, 1876.

Respectfully forwarded to the headquarters of the Army,

P. H. SHERIDAN,
Lieutenant-General Commanding.

HEADQUARTERS OF THE ARMY,
Saint Louis, March 20, 1876.

Respectfully forwarded to the Secretary of War.

W. T. SHERMAN, *General.*

WAR DEPARTMENT,
Washington City, March 27, 1876.

SIR: I have the honor to transmit for your information a copy of a telegram from Major Brisbin, Second Cavalry, reporting his arrival at Fort Pease, and the condition of things there.

Very respectfully, your obedient servant,

ALPHONSO TAFT,
Secretary of War.

HON. SECRETARY OF THE INTERIOR.

HEADQUARTERS FORT ELLIS, MONT.,
March 21, 1876.

SIR: I have the honor to report that in compliance with telegram from headquarters Department of Dakota, dated February 19, 1876, I left the post February 22, 1876, for Fort Pease, Montana Territory.

My command was composed of the four companies of the Second Cavalry (F, G, H, and L,) stationed at this post, a detachment of Company C, Seventh Infantry, under First Lieutenant William Quinton, Seventh Infantry, one assistant surgeon, one hospital steward, and fifteen citizens from Bozeman, Mont. Total strength, 14 officers, 192 enlisted men, and 15 citizens.

The detachment of infantry, 12 men, was placed in charge of one 12-pounder Napoleon gun and one Gatling gun; the train consisted of — wagons, and the command was supplied with rations and four pounds of grain for thirty days.

February 22.—The command marched over the divide between the post and Yellowstone River; distance, 14 miles.

February 23.—Marched to a point on Yellowstone River opposite Old Crow Agency; distance, 22 miles.

February 24.—Marched down river 15 miles, crossed to right bank, and camped 2 miles below crossing; distance, 17 miles.

February 25.—Marched to the "Bowlder," 7 miles; thence to Big Deer Creek, 2 miles; thence to Little Deer Creek, 2 miles; thence to Point of Rocks, on Yellowstone, 4 miles; total distance, 20 miles.

February 26.—Marched to Bridger's Creek, 3 miles; thence down river 11 miles; total, 14 miles.

February 27.—Crossed to left bank of river and marched 9 miles; recrossed to right bank and camped 2 miles below crossing, near mouth of "Stillwater;" total, 11 miles. At this point the command was joined by Lieutenant Schofield, Second Cavalry, with twenty-five citizens and thirty Crow Indians, from the Crow agency, I having sent Lieutenant Schofield in advance of the command to that point to secure as many citizens and Indians as he could to accompany the expedition.

February 28.—Marched down river 5 miles; crossed to left bank, thence down 9 miles; total, 14 miles. At this camp the command was joined by twenty-four Crow Indians, making in all fifty-four.

February 29.—Marched down left bank 20 miles.

March 1.—Marched down left bank to Baker's battle-ground, 16 miles; thence 3 miles, and crossed to right bank, and camped one mile below crossing; total, 20 miles. Three cavalry-horses were drowned at this camp by the ice breaking in while watering.

March 2.—Marched down right bank to "Pompey's Pillar," 20 miles.

March 3.—Crossed river and marched on "Stanley's" road of 1873, 20 miles, and camped about 6 miles from the river.

March 4.—Marched to river, 6 miles; crossed to right bank; thence down 2 miles; crossed to left bank; thence down left bank 8 miles to Fort Pease; total, 16 miles.

March 5.—Remained in camp at Fort Pease. The original garrison consisted of forty-six men, of whom six were killed and eight wounded. Twenty-one men had left the fort and gone through to the settlements by night. I found in the fort eighteen white men and one negro.

March 6.—The fort was evacuated, and all the men started back with my command. I brought away all the valuable property belonging to the men at Pease and took it to the mouth of Stillwater, where there is no danger of hostile Indians at present, and unloaded it. I saw no Indians, and but small parties are about. My scouts report the Indians have removed their villages from the Big and Little Horn Rivers and are camped on the Rosebud. The command marched back 8 miles and crossed to right bank.

March 7.—Marched up right bank 12 miles; crossed, and marched up left bank 2 miles; crossed to right bank, and camped 4 miles above crossing; total, 18 miles. A scouting-party was sent out during the night to go across the country to where the mouth of the Little Horn could be seen, the Crows having reported that a camp of Sioux was probably located near that point. The party returned the afternoon of the 7th, having been in full view of the Valley of the Big Horn, both above and below the mouth of the Little Horn, but saw no sign of hostile Indians.

March 8.—Marched up river and camped near "Pompey's Pillar;" distance, 5 miles.

March 9.—Marched up river 16 miles; crossed, and camped on right bank 4 miles from Baker's battle-ground; distance, 18 miles.

March 10.—Marched up river and camped near mouth of Cañon Creek; 19 miles.

March 11.—Marched up river 16 miles.

March 12.—Marched up river 7 miles; crossed; thence 5 miles to Stillwater; thence 1 mile, and crossed to left bank; thence up river 1 mile to Countryman's Ranch; 14 miles.

March 13.—Marched up river 8 miles and crossed; thence 12 miles to Bridger's Creek; thence 2 miles to Point of Rocks; total, 22 miles.

March 14.—Marched up river to Little Deer Creek, 4 miles; thence to Big Deer Creek, 2 miles; thence 7 miles to the "Bowler;" thence 3 miles, and camped on right bank of Yellowstone; total, 16 miles.

March 15.—Marched up river 8 miles and crossed thence to Hot Spring Creek, 4 miles; thence to a point on river opposite "Old Agency," 8 miles; total, 20 miles.

March 16.—Marched to Shields River, near mouth, 7 miles; thence to Benson's Crossing of Yellowstone, 3 miles; thence on Bozeman Road to a point near Quinn's Ranch; total, 22 miles.

March 17.—Marched into Fort Ellis, distance 12 miles. Distance marched from Ellis to Fort Pease, 208 miles; distance marched from Pease to Ellis, 190 miles; total distance marched, 398 miles.

The crossings of the Yellowstone were all made upon the ice, except the first. One mule gave out, and had to be abandoned on the road.

Very respectfully, your obedient servant,

JNO. S. BRISBIN,

Major Second Cavalry, Commanding Post.

ASSISTANT ADJUTANT-GENERAL,

Department of Dakota, Saint Paul, Minn.

Copy forwarded by department and division commanders.

WAR DEPARTMENT,
Washington City, April 20, 1876.

SIR: I have the honor to transmit for your information copy of the report of Maj. J. S. Brisbin, commanding Fort Ellis, Mont., dated the 21st ultimo, of march with his command to Fort Pease to relieve the settlers at that point, who were attacked by hostile Indians.

Very respectfully,

ALPHONSO TAFT,
Secretary of War.

Hon. SECRETARY OF THE INTERIOR.

[Telegram.]

SAINT LOUIS, MO.,
March 25, 1876.

General Sheridan telegraphs that he has received dispatch from General Crook, Fort Reno, March 22; cut loose from wagon-train on 7th instant; scouted Tongue and Rosebud Rivers until satisfied there were no Indians upon them, then struck across country toward Powder River. General Reynolds, with part of command, was pushed forward on a trail leading to village of Crazy Horse, near mouth of Little Powder River. This he attacked and destroyed on the morning of the 17th, finding it a perfect magazine of ammunition, war material, and general supplies. Crazy Horse had with him the Northern Cheyennes, and some of the Minneconjoux, probably in all one half of the Indians of the reservation. Every evidence was found to prove these Indians to be in copartnership with those at the Red Cloud and Spotted Tail agencies, and that the proceeds of their raids upon the settlements have been taken into those agencies and supplies brought out in return. In this connection I would again urgently recommend the immediate transfer of the Indians of those agencies to the Missouri. Am satisfied that if Sitting Bull is on this side of the Yellowstone he is camped at mouth of Powder River, but did not go there for reasons to be given by letter. Had terrible severe weather during absence from wagon-train; snowed every day but one, and the mercurial thermometer on several occasions failed to register. Will be at Fetterman 26th instant, and if you desire me to move these Indians, please have instructions for me by this date, or else I shall return the cavalry to railroad at once for recuperation.

WHIPPLE,
Assistant Adjutant-General.

General W. T. SHERMAN,
Washington, D. C.

[Telegram.]

FORT LINCOLN, DAKOTA TERRITORY,
April 27, 1876.

TO ASSISTANT ADJUTANT-GENERAL,
Saint Paul:

Sioux scout from Standing Rock reports all young men are leaving reservation with best ponies. They report going to fight Crow Indians, but he says they are going to join Sitting Bull.

RENO,
Commanding.

[Indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, May 1, 1876.

Respectfully forwarded to the Adjutant-General for the information
of the General of the Army.

P. H. SHERIDAN,
Lieutenant-General, Commanding.

WAR DEPARTMENT,
Washington City, May 6, 1876.

SIR: I have the honor to transmit for your information copy of telegram from the commanding officer at Fort Lincoln, Dakota Territory, reporting that scout from Standing Rock states that all the young men are leaving the reservation with best ponies; that they say they are going to fight the Crows, but he thinks they are going to join Sitting Bull.

Very respectfully, your obedient servant,

ALPHONSO TAFT,
Secretary of War.

Hon. SECRETARY OF THE INTERIOR.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, Ill., May 29, 1876.

GENERAL: Brigadier-General Terry moved out his command from Fort A. Lincoln in the direction of the mouth of the Powder River on the 17th instant. The total strength of his column is about nine hundred men, exclusive of the force of three companies of infantry in charge of supply-camp at Glendive Creek, the old supply-station on the Yellowstone River.

Brigadier-General Crook will move from Fort Fetterman with a column about the same size.

Col. John Gibbon is now moving down north of the Yellowstone and east of the mouth of the Big Horn, with a force of about four hundred, all but four companies of which are infantry.

As no very accurate information can be obtained as to the location of hostile Indians, and as there would be no telling how long they would stay at any one place, if it was known, I have given no instructions to Generals Crook or Terry, preferring that they should do the best they can under the circumstances, and under what they may develop, as I think it would be unwise to make any combinations in such a country as they will have to operate in. As hostile Indians, in any great numbers, cannot keep the field as a body for a week, or at most ten days, I therefore consider—and so do Terry and Crook—that each column will be able to take care of itself, and of chastising the Indians, should it have the opportunity.

The organization of these commands and what they expect to accomplish has been as yet left to the department commanders. I presume that the following will occur:

General Terry will drive the Indians toward the Big Horn Valley, and General Crook will drive them back toward Terry; Colonel Gibbon moving down on the north side of the Yellowstone to intercept, if possible, such as may want to go north of the Missouri to the Milk River.

The result of the movement of these three columns may force many of the hostile Indians back to the agencies on the Missouri River and to the Red Cloud and Spotted Tail agencies on the northern line of Nebraska, where nearly every Indian, man, woman, and child, is at heart a friend.

It is easy to foresee the result of this condition, that as soon as the troops return in the fall, the Indians will go out again, and another campaign, with all its expenses, will be required, as was the case with the Cheyennes, Arapahoes, Comanches, and Kiowas, of the Indian Territory.

To obviate this, I advise that the two posts recommended by me be established on the Yellowstone, and that the military be allowed to exercise control over the Indians at the agencies, to such an extent as to prevent any friendly Indians from leaving to join the hostile Indians, and the latter or any of their families from coming in, except by unconditional surrender, the ringleaders to be punished, as were the southern Indians, by having them sent to some distant point until they and their people are willing to behave themselves.

I hope that good results may be obtained by the troops in the field, but am not at all sanguine, unless what I have above suggested be carried out. We might just as well settle the Sioux matter now. It will be better for all concerned.

Yours, truly,

P. H. SHERIDAN,
Lieutenant-General.

General W. T. SHERMAN,
Headquarters of the Army, Washington, D. C.

[Indorsement.]

HEADQUARTERS OF THE ARMY,
Washington, May 31, 1876.

Respectfully submitted to the honorable Secretary of War, inviting his special attention to General Sheridan's remarks on the operations just begun against the hostile Sioux outside their reservation, and asking instructions as to his inquiry about extending the authority of the military over the agencies of Red Cloud and Spotted Tail pending these movements.

W. T. SHERMAN,
General.

[Telegram.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, Ill., May 30, 1876.

General W. T. SHERMAN,
Washington, D. C.:

I wrote you yesterday about the Sioux Indian troubles, making some suggestions. Since writing, the information from Crook goes to show that all the agency Indians capable of taking the field are now, or will be, on the war-path. And if this intelligence is confirmed, I will order eight companies of the Fifth Cavalry to Red Cloud agency, and will ask you to let the Indian Department give the military the same control as was done at Fort Sill and at Cheyenne agency in the Indian Territory during the troubles there.

Pope can spare the Fifth Cavalry in the present necessity for it.

P. H. SHERIDAN,
Lieutenant-General.

[Telegram.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, Ill., May 31, 1876.

General E. D. TOWNSEND.

Washington, D. C.:

The following just received from the commanding officer, Fort Laramie:

"Egan returned from scout via Red Cloud night of 28th. On 7th, he met on Powder River trail about one hundred lodges of families and seven or eight hundred warriors, all going north. He did not think it prudent to attack, and they did not molest him, but had just before attacked a train; drew off as he approached. At Red Cloud, he learned that the agency is almost deserted.

"About eight hundred or one thousand warriors gone to mouth of Powder River; most of the families also gone, but some left. About fifty lodges from Spotted Tail also gone, some with families. Young men generally going on the war-path. I telegraphed this to General Crook this morning."

P. H. SHERIDAN,
Lieutenant-General.

WAR DEPARTMENT,
Washington City, June 2, 1876.

SIR: I have the honor to transmit, for your information, copy of letter from Lieutenant-General Sheridan, dated the 29th ultimo, in regard to the operations just begun against the hostile Sioux, and asking that the military be allowed to exercise authority over the Red Cloud and Spotted Tail agencies.

I also inclose copy of telegram from General Sheridan, dated the 31st ultimo, reporting movements of hostile Indians.

(Signed in Cabinet:)

J. D. CAMERON,
Secretary of War.

The Hon. SECRETARY OF THE INTERIOR.

[Telegram.]

OMAHA, NEBR., June 8, 1876.

ASSISTANT ADJUTANT-GENERAL,

Headquarters Military Division Missouri, Chicago, Ill.:

Commanding officer at Laramie reports: Hand, Indian courier from Red Cloud, brings report that just before he left an Indian arrived from the mouth of Tongue River; found there twelve hundred and seventy-three lodges under Sitting Bull, Crazy Horse, and others, on their way to Powder River to fight General Crook. On his return he met same band that Egan saw May 17. They told him that they had met Custer's troops, and had fought them all day; many killed on both sides. No result reported. This occurred about eight days ago. He also reports Spotted Tail at Laramie yesterday, who says his people are at home, and will not go out, and that many have left Red Cloud and other agencies on the Missouri River.

R. WILLIAMS,
Assistant Adjutant-General.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, June 9, 1876.

Respectfully forwarded to the Adjutant-General of the Army.
P. H. SHERIDAN,
Lieutenant-General, Commanding.

WAR DEPARTMENT,
Washington City, June 14, 1876.

SIR: I have the honor to transmit for your information copy of dispatch from the headquarters Department of the Platte, date June 8, 1876, communicating report of commanding officer Fort Laramie, relative to Indian hostilities, and rumored battle between Custer's command and Indians.

Very respectfully, your obedient servant,

H. T. CROSBY, *Chief Clerk,*
For the Secretary of War in his absence.

The Hon. SECRETARY OF THE INTERIOR.

SAINT PAUL, MINN., 10.

ADJUTANT-GENERAL, *Division of the Missouri, Chicago :*

Following just received :

"CAMP ON LITTLE MISSOURI,
" May 30, (via Bismarck, June 10.)

" We reached this place yesterday; to-day has been employed in scouting up the valley and making a road through the bad lands west of river. Contrary to all the predictions of the guides and scouts, no Indians have been found here, and there are no signs that any have been in this neighborhood within six months or a year. I intend to push on about two marches, halt, and again push a party well to the south, hoping to find trails, and if none are found, I may halt once more for the same purpose before reaching the Yellowstone. We have had a great deal of hard work making a road yesterday and the day before; we built thirteen bridges over Davis Creek. Our progress has, therefore, been slower than I could have wished, but the force is in excellent condition; few are sick, and the animals have greatly improved since we left Fort Lincoln.

" ALFRED H. TERRY,
" *Brigadier-General.*"

Commanding officer at Lincoln reports scout will start on return Sunday morning; telegrams for expedition should go through to Lincoln to-night.

RUGGLES,
Assistant Adjutant-General.

[Indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, June 12, 1876.

Official copy, respectfully forwarded to the Adjutant-General of the Army.

In the absence of the Lieutenant-General,

M. V. SHERIDAN,
Lieutenant-Colonel and A. D. C.

WAR DEPARTMENT,
Washington City, June 16, 1876.

SIR: I have the honor to transmit for your information copy of telegram from General Terry reporting progress of the expedition under his command.

Very respectfully, your obedient servant,

H. T. CROSBY, *Chief Clerk,*
For and in the absence of the Secretary of War.

THE HON. SECRETARY OF THE INTERIOR.

SAINT PAUL, MINN., 19.

ADJUTANT-GENERAL *Division Missouri, Chicago:*

The following just received:

"CAMP AT JUNCT. OF POWDER AND YELLOWSTONE RIVERS,
June 12, 1876.

"Reached Powder River at a point twenty-four miles above here, late on the 7th inst. No Indians east of Powder River. Reno with six companies Seventh Cavalry is now well up the river on his way to the Forks, whence he will cross to and come down Mispah Creek, and thence by Pumpkin Creek to Tongue River, where I expect to meet him with the rest of the cavalry and fresh supplies. I intend then, if nothing new is developed, to send Custer with nine companies of his regiment upon the Tongue, and thence across to and down the Rosebud, while the rest of the Seventh will join Gibbon, who will move up the Rosebud. Have met Gibbon and concerted movements with him. Troops and animals in fine condition.

"ALFRED H. TERRY,
"Brigadier-General."

RUGGLES,
Assistant Adjutant-General.

Official copy.

M. V. SHERIDAN,
Lieutenant-Colonel and A. D. C.

[Indorsement.]

HEADQUARTERS MILITARY DIVISION MISSOURI,
Chicago, June 30, 1876.

Respectfully forwarded to the Adjutant-General of Army.

In the absence of the Lieutenant-General,

M. V. SHERIDAN,
Lieutenant-Colonel and A. D. C.

WAR DEPARTMENT,
Washington City, June 26, 1876.

SIR: I have the honor to inclose for your information copy of telegram from General A. H. Terry, dated the 12th instant, reporting his arrival at the junction of the Powder and Yellowstone Rivers, and giving intended movements of troops of his column.

Very respectfully,

J. D. CAMERON,
Secretary of War.

THE HON. SECRETARY OF THE INTERIOR.

[Telegram.—Dated Chicago, June 23, 1876.—Received 7.15 p. m., June 23, 1876.]

To General E. D. TOWNSEND,
Washington, D. C.:

The following dispatch from General Crook is forwarded for the information of the General of the Army :

“CAMP ON SOUTH OF TONGUE RIVER, WYOMING,
“June 19, (via Fort Fetterman, 23d.)

“Lieutenant-General SHERIDAN,
Chicago, Ill. :

“Returned to camp to-day, having marched as indicated in my last telegram. When about forty miles from here, on Rosebud Creek, Montana, morning of 17th instant, scouts reported Indians in vicinity, and within a few minutes we were attacked in force, the fight lasting several hours. We were near the mouth of a deep cañon, through which the creek ran; the sides were very steep, covered with pine, and apparently impregnable; the village supposed to be at the other end, about eight miles off. They displayed strong force at all points, occupying so many and such covered places that it is impossible to correctly estimate their numbers. The attack, however, showed that they anticipated that they were strong enough to thoroughly defeat the command. During the engagement I tried to throw a strong force through the cañon, but I was obliged to use it elsewhere before it had gotten to the supposed location of the village. The command finally drove the Indians back in great confusion, following them several miles, the scouts killing a good many during the retreat. Our casualties were nine men killed and fifteen wounded of the Third Cavalry, two wounded Second Cavalry, three men wounded Fourth Infantry, and Captain Henry, Third Cavalry, severely wounded in the face. It is impossible to correctly estimate the loss of the Indians; many being killed in the rocks, others being gotten off before we got possession of that part of the field; thirteen dead bodies being left. We remained on the field that night, and having nothing but what each man carried himself, we were obliged to return to the train to properly care for our wounded, who were transported here on mule-litters, are comfortable, all doing well. I expect to find those Indians in rough places all the time, and so have ordered five companies of infantry, and shall not probably make any extended movement until they arrive. Officers and men behaved with marked gallantry during the engagement.

“CROOK,
“Brigadier-General.”

The movements of General Terry indicated in his dispatch of 12th instant lead me to believe that he is at or near the Rosebud. About this time he has formed a junction with Gibbon, and will undoubtedly take up the fight which Crook discontinued for want of supplies and to take care of his wounded. I communicated to General Crook by courier from Fetterman the position and intentions of General Terry; he must have received it before this date.

P. H. SHERIDAN,
Lieutenant-General.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., June 4, 1876.

SIR: An Indian recently arrived from Cheyenne Indian agency reports that a large war party, composing Indians from Spotted Tail's and

Cheyenne River Indian agencies, left the latter place with the avowed intention of going to Fort Berthold agency to attack the Rees.

One of the party came into this agency last night, probably to obtain re-enforcements. He reports the war party seven days out, and at some distance below Standing Rock, awaiting other re-enforcements from Cheyenne.

The above information I have communicated by scout to the commanding officers of Forts Rice, Abraham Lincoln, and Stevenson, Dak.

I learn from reliable authority to-day that Kill Eagle, a prominent chief of the Blackfeet Sioux at this agency, who lately left with 20 lodges, ostensibly to hunt, has certainly joined the hostile Sitting Bull. Many of the young men belonging to this agency have left the agency; some on the pretext of hunting game, who are now probably with Sitting Bull. The principal chiefs remain here, and did they receive an adequate and proper supply of food would, I think, continue here, disposed upon every consideration to preserve the peace. But notwithstanding that the agent has officially reported and estimated for rations for over 7,000 Indians at this agency, and he is required by United States statutes to issue to and report the numbers actually present, and that there has not been to exceed a monthly average of 4,500, the rations are so diminished as to cause partial distress and dissatisfaction.

The following memorandum of issues June 3 was prepared on the statement of one of the most reliable Indians at this agency:

A diminished quantity of flour and corn, a little coffee, usual quantity of beans; but the corn is not ground, and beef has not been issued for three weeks. Bacon and pork have not been issued for three months. Sugar and tobacco have not been issued for two weeks. The corn is not available as food, yet an engine and mill are, but not used.

Other items go to show that there is, besides the deliberate falsehoods uttered by this agent in his official report to the Commissioner of Indian Affairs as to the products of Indian labor, &c., last year, either gross maladministration or inefficiency, or both, as the supplies sent here for 7,000 certainly should be ample for 4,500 Indians. Last year these Indians starved for one month.

In consideration of the organized expeditions against the hostiles, their relatives, should these agency Indians generally join the hostile camp it ought to be charitably attributed to the want of food two years in succession, which they have been compelled to suffer, and which, if issued to them, would keep them, as no other bond or attraction can, at these reservation-homes, with confidence in the promises of their great father.

Very respectfully, your obedient servant,

J. S. POLAND,

Captain Sixth Infantry, Commanding.

The ASSISTANT ADJUTANT-GENERAL,

Department of Dakota, Saint Paul, Minn.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., June 9, 1876.

Official copy respectfully forwarded to headquarters Military Division of the Missouri, for the information of the Lieutenant-General.

GEO. D. RUGGLES,

Assistant Adjutant-General, in the absence of the Dept. Commander.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, June 12, 1876.

Respectfully forwarded to the Adjutant-General of the Army.
In the absence of the Lieutenant-General,

M. V. SHERIDAN,
Lieutenant-Colonel and A. D. C.

WAR DEPARTMENT,
Washington City, June 19, 1876.

SIR: I have the honor to transmit for your information copy of the report of the commanding officer at Standing Rock Indian agency, Dakota Territory, dated the 4th instant, stating that a large war party, composing Indians from Spotted Tail's and Cheyenne River agencies, had left the latter place with the avowed intention of going to Fort Berthold agency to attack the Rees; also, that Indians are joining Sitting Bull from Standing Rock agency, and attributing the cause of these movements to the insufficient supply of food, &c.

Very respectfully,

J. D. CAMERON,
Secretary of War.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., June 15, 1876.

SIR: I respectfully inform you that I have this day forwarded to commanding officers of Forts Rice, Lincoln, and Stevenson the following:

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"SIR: Since my letter of advice respecting a Sioux war-party *en route* to attack the Rees, I have learned (to-day) that through the decided and prompt action of the Indian agent, Mr. H. W. Bingham, Cheyenne River agency, and the influence of the head-men at that agency, the party has been induced to abandon its expedition and return to its (Spotted Tail's) agency. This information was received from Indians direct from Cheyenne River agency.

"Very respectfully, &c."

Which explains itself. I believe this information to be reliable, and do not apprehend trouble from that party at present. I learned that the agent furnished them with rations, and the Indians gave some horses, with which the hostiles expressed themselves content, and gave a promise to return to their own agency.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., June 21, 1876.

Official copy respectfully forwarded to headquarters Military Division of the Missouri, for the information of the Lieutenant-General, in con-

nection with Captain Poland's previous report on the subject of this war party, copy of which was forwarded on the 9th instant.

GEO. D. RUGGLES,
Assistant Adjutant-General, in the absence of the Dept. Commander.

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, June 23, 1876.

Respectfully forwarded to the Adjutant-General of the Army.
P. H. SHERIDAN,
Lieutenant-General, Commanding.

WAR DEPARTMENT,
Washington City, July 1, 1876.

SIR: I have the honor to transmit for your information copy of communication received at headquarters Department of Dakota, concerning the abandonment of the expedition by the war-party of Sioux from Spotted Tail agency, which recently left there to attack the Rees.

Very respectfully, your obedient servant,
J. D. CAMERON,
Secretary of War.

The Hon. SECRETARY OF THE INTERIOR.

HEADQUARTERS UNITED STATES MILITARY STATION,
Standing Rock, Dak., June 19, 1876.

SIR: This morning Matto-un-pah, (Two Bears,) chief of the Yanton-nais, brought me information that another party, 300 strong, of Brulés and Ogalallas, from Red Cloud and Spotted Tail agencies, six days ago, were west of this agency, on their way to attack the Rees at Fort Berthold; that they are a different party of Indians from those turned back from Cheyenne agency. I have sent the information to the commanding officers of Forts Rice, Lincoln, and Stevenson by scout. The party is reported across the North Fork of the Cannon Ball River. None of the Indians from this agency have joined this party as far as known.

Very respectfully, your obedient servant,
J. S. POLAND,
Captain Sixth Infantry, Bvt. Lieut. Col. U. S. A., Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., June 23, 1876.

Official copy respectfully forwarded to headquarters Military Division of the Missouri for the information of the Lieutenant-General.

GEO. D. RUGGLES,
Assistant Adjutant-General, in the absence of the Dept. Commander.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, June 26, 1876.

Respectfully forwarded to the Adjutant-General of the Army.
P. H. SHERIDAN,
Lieutenant-General, Commanding.

WAR DEPARTMENT,
Washington City, July 5, 1876.

SIR: I have the honor to transmit for your information copy of communication from the commanding officer, Standing Rock agency, stating that another party of Brulés and Ogalallas from Red Cloud and Spotted Tail agencies are on their way to attack the Rees at Fort Berthold, &c.

Very respectfully, your obedient servant,

H. T. CROSBY,
Chief Clerk, For the Secretary of War, in his absence.

The Hon. SECRETARY OF THE INTERIOR.

HEADQUARTERS MILITARY STATION,
Standing Rock, Dak., June 21, 1876.

SIR: I obtained the following information to-day from two Indians just returned from the war party against the Rees: After crossing the South Fork of Cannon Ball River, a council of war was held, when it was determined to make an attack on Fort Abraham Lincoln. The party has dwindled down to seventy-odd, forty from Cheyenne River agency, including a petty chief named "The Yearling," and thirty from Spotted Tail's. They were to leave camp on South Fork direct for Lincoln Monday morning.

Have notified the commanding officer by scout.

Very respectfully, your obedient servant,

J. S. POLAND,
Captain Sixth Infantry, Commanding.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

HEADQUARTERS FORT ABRAHAM LINCOLN, DAK.,
June 27, 1876.

SIR: I have the honor to report that a party of Indians supposed to be a war party made their appearance in front the line at this post on the morning of 25th instant. The number of Indians variously estimated from twelve to forty. A few shells were thrown at them when they disappeared. Scouts followed them to Heart River, but nothing has since been seen or heard of the hostile party. The scouts report were unable to trail them.

Respectfully, your obedient servant,

WM. S. McCASKEY,
Captain Twentieth Infantry, Commanding Post.

The ASSISTANT ADJUTANT-GENERAL,
Department of Dakota, Saint Paul, Minn.

HEADQUARTERS DEPARTMENT OF DAKOTA,
Saint Paul, Minn., June 30, 1876.

Official copies respectfully forwarded to headquarters Military Division of the Missouri for the information of the Lieutenant-General.

GEO. D. RUGGLES,
Assistant Adjutant-General, in the absence of the Dept. Commander.

[First indorsement.]

HEADQUARTERS MILITARY DIVISION OF THE MISSOURI,
Chicago, July 3, 1876.

Respectfully forwarded to the Adjutant-General of the Army.
In the absence of the Lieutenant-General,

R. C. DRUM,
Assistant Adjutant-General.

WAR DEPARTMENT,
Washington City, July 12, 1876.

SIR: I have the honor to transmit, for your information, copy of correspondence relative to a war party of Indians from Cheyenne and Spotted Tail agencies making their appearance at Fort Abraham Lincoln, Dak., for the purpose of making an attack on that post.

Very respectfully,

J. D. CAMERON,
Secretary of War.

The Hon. SECRETARY OF THE INTERIOR.

○

COMMERCIAL INTERCOURSE WITH MEXICO AND CENTRAL
AMERICA.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

IN RESPONSE TO

*A resolution of the House of Representatives in relation to the commercial
intercourse between the United States and Mexico and Central America.*

JULY 20, 1876.—Referred to the Committee on Commerce and ordered to be printed.

To the House of Representatives:

I transmit a report from the Secretary of State, in answer to the resolution of the House of Representatives of the 1st of April last, on the subject of commercial intercourse with Mexico and Central America.

U. S. GRANT.

WASHINGTON, 19th July, 1876.

To the President:

The Secretary of State has the honor to report that he received a resolution of the House of Representatives of the 1st of April last, directing him to furnish that House, "if not incompatible with the public interests, copies of all correspondence with the ministers of the United States to Mexico and the Central American States relative to the extension of commercial relations with those countries." The Secretary of State is of the opinion that a compliance with the resolution at this time would be adverse to the public interests.

Respectfully submitted.

HAMILTON FISH.

DEPARTMENT OF STATE,

Washington, 19th July, 1876.

SECTIONS 3946, 3951, AND 3954 OF THE REVISED STATUTES
OF THE UNITED STATES.

M E S S A G E

FROM THE

PRESIDENT OF THE UNITED STATES,

TO THE

*House of Representatives, assigning reasons for withholding his approval
of House bill No. 2684.*

JULY 20, 1876.—Referred to the Committee on the Post-Office and Post-Roads and
ordered to be printed.

To the House of Representatives :

I have the honor to return herewith without my approval House bill No. 2684, entitled "An act to amend sections 3946, 3951, and 3954 of the Revised Statutes."

It is the judgment of the Postmaster-General, whose report accompanies this message, that if this bill should become a law in its present form it would fail to give effect to its provisions.

The remedial suggestions in his report are respectfully recommended to your attention.

U. S. GRANT.

EXECUTIVE MANSION, *July 20, 1876.*

POST-OFFICE DEPARTMENT,
Washington, D. C., July 19, 1876.

SIR: I have the honor to return herewith House bill No. 2684, to amend sections 3946, 3951, and 3954 of the Revised Statutes, with the following objections thereto:

The sections of the Revised Statutes which this bill proposes to amend were substantially repealed by the 12th section of the act entitled "An act making appropriations for the service of the Post-Office Department, for the fiscal year ending June 30, 1875, and for other purposes," approved June 23, 1874. The sections of the Revised Statutes numbered as indicated in the bill were enacted as sections 246 and 251 of the "Act to revise, consolidate, and amend the statutes relating to the Post-Office Department," approved June 8, 1872. These sections were subsequently embodied in the revision of the statutes.

If the accompanying bill should become a law in its present form, it would, in my judgment, fail to give effect to its provisions. The bill is a very important one for the service of the Post-Office Department. Efforts have been made for four or five years past to induce Congress to pass just such a law. To break up the vicious system of straw-bidding, this bill would be very valuable, and I regret exceedingly that a mistake should have been made in the title and enacting clause which will render its provisions inoperative.

I therefore suggest that the attention of the House, in which it originated, shall be called to the defects in the bill explained above, and to enable that body to understand very fully what, in my judgment, would be required to perfect it I would suggest that the title should read, "A bill to amend subsections 246 and 251 of section twelve, of an act entitled 'An act making appropriations for the service of the Post-Office Department, for the fiscal year ending June 30, 1875, and for other purposes,' approved June 23, 1874; and also to amend section 3954 of the Revised Statutes;" and that the enacting clause of the bill should be changed in conformity therewith.

I have the honor to be, with great respect, your obedient servant,

JAS. N. TYNER,
Postmaster-General.

The PRESIDENT OF THE UNITED STATES,
Washington, D. C.

Forty-fourth Congress of the United States, at the first session, begun and held at the city of Washington, in the District of Columbia, on Monday, the sixth day of December, eighteen hundred and seventy-five.

AN ACT to amend sections thirty-nine hundred and forty-six, thirty-nine hundred and fifty-one, and thirty-nine hundred and fifty-four of the Revised Statutes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That sections three thousand nine hundred and forty-six and three thousand nine hundred and fifty-one of the Revised Statutes be amended to read as follows:

"SEC. 3946. That before the bond of a bidder, provided for in the aforesaid section, is approved, there shall be indorsed thereon the oaths of the sureties therein, taken before an officer qualified to administer oaths, that they are owners of real estate worth in the aggregate a sum double the amount of said bond, over and above all debts due and owing by them, and all judgments, mortgages, and executions against them, after allowing all exemptions of every character whatever. Accompanying said bond, and as a part thereof, there shall be a series of interrogatories in print or writing, to be prescribed by the Postmaster-General, and answered by the sureties under oath, showing the amount of real estate owned by them, a brief description thereof, and its probable value; where it is situated; in what county and State the record evidence of their title exists. And if any surety shall knowingly and willfully swear falsely to any statement made under the provisions of this section, he shall be deemed guilty of perjury, and, on conviction thereof, be punished as is provided by law for commission of the crime of perjury.

"SEC. 3951. That after any regular bidder, whose bid has been accepted, shall fail to enter into contract for the transportation of the mails, according to his proposal, or, having entered into contract, shall fail to commence the performance of the service stipulated in his or their contract, as therein provided, the Postmaster-General shall proceed to contract with the next lowest bidder or bidders, in the order of their bids, for the same service, who will enter into a contract for the performance thereof, unless the Postmaster-General shall consider such bid or bids too high; and in case each of said bids shall be considered too high, then the Postmaster-General shall be authorized to enter into contract, at a price less than that named in said bids, with any person, whether a bidder or not, who will enter into contract to perform the service in accordance with the terms and provisions prescribed for the execution of other contracts for similar service; and in case no satisfactory contract can be thus obtained, he shall re-advertise such route. And if any bidder, whose bid has been accepted, and who has

AMENDMENT OF REVISED STATUTES.

entered into a contract to perform the service according to his proposal, and, in case of his contract, has entered upon the performance of the service, to the satisfaction of the Postmaster-General, shall subsequently fail or refuse to perform the service according to his contract, the Postmaster-General shall proceed to contract with the next lowest bidder for such service, under the advertisement thereof, (unless the Postmaster-General shall consider such bid too high,) who will enter into contract, as a condition, with sureties, to be approved by the Postmaster-General, for the faithful performance thereof, in the same penalty and with the same terms and conditions annexed as were stated and contained in the bond which accompanied his bid; and if the said next lowest bidder shall decline to enter into contract for the performance of such service, then the Postmaster-General may award the service to, and enter into contract with, any person, whether a bidder on said route or not, who will enter into contract to perform the service and execute a bond of like tenor and effect as that required of bidders, in a penalty to be prescribed and with sureties to be approved by the Postmaster-General for the performance of the service contracted to be performed, at a price not exceeding that named in the bid of the said next lowest bidder; and such contract can be secured at the price named in said next lowest bid, then the Postmaster-General shall proceed to secure a contract, at a price not considered too high, with any person who will execute such contract in accordance with the law applicable thereto, giving, in all cases, the preference to the regular bidders on the list who do not exceed the price at which others will contract therefor; and, if no satisfactory contract can be thus secured, the route shall be re-advertised. Whenever an accepted bidder shall fail to enter into contract, or a contractor on any mail-route shall refuse to perform the service on said route according to his contract, or when no route shall be established or new service required, or when, from any other cause, a contractor shall be a contractor legally bound or required to perform such service, the Postmaster-General may make a temporary contract for carrying the mail on such route under the advertisement, for such period as may be necessary, not in any case exceeding six months, until the service shall have commenced under a contract made according to law: *Provided, however,* That the Postmaster-General shall not employ temporary service on any route at a higher price than that paid to the contractor who shall have performed the service during the last preceding contract term. And in all cases of regular contracts hereafter made, the contract may, in the discretion of the Postmaster-General, be continued in force beyond its express terms, for a period not exceeding six months, until a new contract with the same or other contractors shall be made by the Postmaster-General. And that section thirty-nine hundred and fifty-fifth of the Revised Statutes be amended to read as follows:

"Any person or persons bidding for the transportation of the mails upon any route which may be advertised to be let, and receiving an award of the contract for such service, who shall wrongfully refuse or fail to enter into contract with the Postmaster-General in due form to perform the service described in his or their bid or proposal, or having entered into such contract, shall wrongfully refuse or fail to perform such service, shall, for any such failure or refusal, be deemed guilty of a misdemeanor, and be punished by a fine of not more than five thousand dollars, and by imprisonment for not more than twelve months. And the failure or refusal of any such person or persons to enter into such contract in due form, or, having entered into such contract, the failure or refusal to perform such service shall be *prima facie* evidence in all actions or prosecutions arising under this section that such failure or refusal was wrongful."

MILTON SAYLER,

Speaker of the House of Representatives pro tempore

T. W. FERRY,

President of the Senate pro tempore

I certify that this act originated in the House of Representatives.

Attest:

GEO. M. ADAMS, Clerk

APPROPRIATIONS FOR SUNDRY CIVIL EXPENSES OF THE
GOVERNMENT.

M E S S A G E

FROM THE

PRESIDENT OF THE UNITED STATES,

TO THE

*House of Representatives, concerning the act making appropriations for
sundry civil expenses of the Government.*

JULY 31, 1876.—Referred to the Committee on Appropriations and ordered to be
printed.

To the House of Representatives :

The act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1877, is so defective in what it omits to provide for, that I cannot announce its approval without at the same time pointing out what seems to me to be its defects. It makes but inadequate provision for the service at best, and in some instances fails to make any provision whatever.

Notably among the first class is the reduction in the ordinary annual appropriations for the revenue-cutter service, to the prejudice of the customs-revenue.

The same may be said of the Signal-Service, as also the failure to provide for the increased expenses devolved upon the mints and assay-offices by recent legislation, and thus tending to defeat the objects of that legislation.

Of this class, also, are public buildings, for the protection, preservation, and completion of which there is no adequate appropriation, while the sum of one hundred thousand dollars only is appropriated for the repairs of the different navy-yards and stations and the preservation of the same, the ordinary and customary appropriations for which are not less than one million dollars.

A similar reduction is made in the expenses for armories and arsenals.

The provision for the ordinary judicial expenses is much less than the estimated amount for that important service, the actual expenditures of the last fiscal year, and the certain demands of the current year.

The provision for the expenses of the surveys of public lands is less than one-half of the usual appropriation for that service and what are understood to be its actual demands.

Reduction in the expenditures for light-houses, beacons, and fog-stations is also made in similar proportion."

Of the class for which no appropriation is made, among the most noticeable, perhaps, is that portion of the general expenses of the District of Columbia, on behalf of the United States, as appropriated in former years, and the judgments of the Court of Claims. The failure to make a reasonable contribution to the expenses of the nation's capital is an apparent dereliction on the part of the United States, and rank injustice to the people here who bear the burdens; while to refuse or neglect to provide for the payment of solemn judgments of its own courts is, apparently, to repudiate. Of a different character, but as prejudicial to the Treasury, is the omission to make provision to enable the Secretary of the Treasury to have the rebel archives and records of captured and abandoned property examined, and information furnished therefrom for the use of the Government.

Finally, without further specification of detail, it may be said that the act which in its title purports to make provision for a diverse and greatly-extended civil service, unhappily appropriates an amount not more than 65 per cent. of its ordinary demands.

The legislative department establishes and defines the service, and devolves upon the Executive Departments the obligation of submitting annually the needful estimates of expenses of such service. Congress properly exacts implicit obedience to the requirements of the law in the administration of the public service, and rigid accountability in the expenditures therefor. It is submitted that a corresponding responsibility and obligation rests upon it to make the adequate appropriations to render possible such administration, and tolerable such exaction. Anything short of an ample provision for a specified service is necessarily fraught with disaster to the public interests, and is a positive injustice to those charged with its execution.

To appropriate and to execute are corresponding obligations and duties, and the adequacy of the former is the necessary measure of the efficiency of the execution.

In this eighth month of the present session of Congress—nearly one month of the fiscal year to which this appropriation applies having passed—I do not feel warranted in vetoing an absolutely necessary appropriation bill; but in signing it I deem it a duty to show where the responsibility belongs for whatever embarrassments may arise in the execution of the trust confided to me.

U. S. GRANT.

EXECUTIVE MANSION,
July 31, 1876.

SURVEY OF POWELL'S, CLINCH, AND EMERY'S RIVERS, IN
VIRGINIA AND TENNESSEE.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

In compliance with the provisions of the river and harbor act of March 3, 1875, reports of Major McFarland on the survey of certain rivers in Virginia and Tennessee.

FEBRUARY 21, 1876.—Referred to the Committee on Commerce.

AUGUST 5, 1876.—Ordered to be printed.

WAR DEPARTMENT, *February 15, 1876.*

The Secretary of War has the honor to transmit to the House of Representatives, in compliance with the provisions of the river and harbor act of March 3, 1875, copies of reports of Major McFarland on surveys of Powell's River from the three forks, in Wise County, Virginia, to the mouth of Clinch River, Tennessee; of Clinch River from the mouth of Indian, in Tazewell County, Virginia, to the junction of Clinch and Powell's Rivers, Tennessee; and Clinch River below the mouth of Emery's River, and Emery's River, above its mouth, Tennessee.

WM. W. BELKNAP,
Secretary of War.

OFFICE OF THE CHIEF OF ENGINEERS,
Washington, D. C., February 12, 1876.

SIR: I beg leave to submit, in further compliance with provisions of the river and harbor act of March 3, 1875, copies of reports to this office from Maj. Walter McFarland, Corps of Engineers, of results of examinations of—

1. Powell's River from the three forks, in Wise County, Virginia, to the mouth of Clinch River, Tennessee;
2. Clinch River from the mouth of Indian, in Tazewell County, Virginia, to the junction of Clinch and Powell's Rivers, Tennessee; and,
3. Clinch River below the mouth of Emery's River, and Emery's River

above its mouth, Tennessee, made with the view of improving the navigation of those streams.

By direction of Brigadier-General Humphreys, and in his absence,
Very respectfully, your obedient servant,

JOHN G. PARKE,
Major of Engineers.

Hon. W. W. BELKNAP,
Secretary of War.

UNITED STATES ENGINEER OFFICE,
Chattanooga, Tenn., February 2, 1876.

GENERAL: I have the honor to submit herewith reports upon the following examinations, ordered by act of Congress approved March 3 1875, viz:

1st. Powell's River from the three forks, in Wise County, Virginia to the mouth of Clinch River, Tennessee.

2d. Clinch River from the mouth of Indian, in Tazewell County, Virginia, to the junction of Clinch and Powell's Rivers, Tennessee.

3d. Clinch River below the mouth of Emery's River, and Emery's River above its mouth, for the removal of bars, Tennessee.

Very respectfully, your obedient servant,

WALTER MCFARLAND,
Major of Engineers.

Brig. Gen. A. A. HUMPHREYS,
Chief of Engineers, U. S. A.

EXAMINATION OF POWELL'S RIVER FROM THE THREE FORKS, IN WISE COUNTY, VIRGINIA, TO THE MOUTH OF CLINCH RIVER, TENNESSEE.

By the wording of this act it will be observed that the examination was to be extended to the mouth of the Clinch River, which is 106 miles (estimated) below the point at which Powell's River empties into it. As the same act of Congress requires, however, the examination of the remaining part of the Clinch, above the mouth of Powell's River, I have thought it best to restrict this report to the examination of Powell's River only, leaving the examination of the lower part of the Clinch to be included in the report upon that river.

From the three forks, in Wise County, Virginia, where the examination was begun, Powell's River runs in a southwesterly direction about one hundred and ninety miles (estimated) to its junction with the Clinch; seventy miles of this length lying in Virginia, and the remaining one hundred and twenty miles in Tennessee.

The valley through which this river flows is surrounded, except to the southward, by ridges and spurs of the Cumberland Mountains, which render it almost inaccessible. It has no railroad facilities.

The river forms its only outlet, and this is narrow, crooked, and so much obstructed by bars, rocky ledges, snags, shoals, mill-dams, and fish-traps that it requires a rain-tide of five or six feet to enable flat-boats to pass down it. It cannot be used at all during the season of low water; and during the season of navigation, which is limited to the winter and spring months, if, as sometimes happens, only two or three boating-tides occur, much of the produce of the valley is left on the farmers' hands, to their great injury.

The region watered by Powell's River and its tributaries is a very fertile one, containing some of the best farming-lands in Virginia and Tennessee, and its annual produce of wheat, corn, oats, bacon, and other farm-products is valued at over \$1,000,000, independently of its timber, iron, and coal. None of this latter is shipped. Not less than one hundred and twenty or one hundred and thirty flat-boats, with cargoes valued at from one thousand to five thousand dollars, come annually out of Powell's River.

Assistant Engineer William M. Gordon, who made this examination, reports that the fall in the lower part of the river is too great, and the supply of water during the summer and autumn too little, to admit of its adaptation to low-water navigation.

All that can be done, then, and all that is asked, is to so improve the high-water navigation that boats may be able to pass out on rain-tides of $3\frac{1}{2}$ or 4 feet. This would increase the safety of the navigation during the higher tides, and would render available for boating many rain-tides, which in the present condition of the river are useless for that purpose.

This could be accomplished by breaking off the points of the ledges which project above low water, blasting and removing the large bowlders which have fallen into the channels, cutting away some points, removing overhanging trees, snags, dams, and fish-traps, and, in a few cases, building wing-dams for the purpose of confining the channel to narrower limits.

The estimated cost of this work is as follows, viz :

For that part of the river lying in Virginia below Shaver's Ford, (above which the character of the river forbids any attempt at improvement,) length, forty miles	\$4,590
For that part lying in Tennessee, length one hundred and twenty miles	15,410
	20,000
Superintendence, contingencies, &c., 25 per cent	5,000
Total	25,000

For more detailed information upon this subject, reference should be made to the report of Assistant Gordon, which is hereto appended :

REPORT OF MR. WILLIAM M. GORDON, ASSISTANT ENGINEER.

Powell's River rises in Wise County, Virginia, and, following a general south-west course through Lee County, Virginia, enters Tennessee, and either passing through or touching Hancock, Claiborne, Union, Campbell, and Anderson Counties, empties into Clinch River about thirty-five miles above Clinton. The principal affluents on the north are Stone Fork, North Fork, Trading Creek, Four Mile, Davis Creek, and Cedar Creek, and, on the south, Station Creek, Wallen's Creek, Mulberry Creek, and Hoop Creek; many smaller ones come in on both sides. For properly understanding the character of the river, I will divide it into four sections, and describe them in order.

Section I embraces that portion from the mouth of South Fork, in Wise County, to Shaver's Ford, in Lee County, Virginia, a distance of about thirty miles.

Section II includes that part from Shaver's Ford to White Shoals, in Lee County, about twenty-eight miles.

Section III extends from White Shoals to the mouth of Hoop Creek, in Claiborne County, Tennessee, a distance of about thirty-five miles.

Section IV embraces the part from Hoop Creek to the junction with Clinch, in Anderson County, Tennessee, a distance of some ninety-six miles.

The distances, as given above, were merely estimated, the estimates being based partly on my own judgment and partly on information derived from persons living on the river. To correct any supposed error the figures should be increased.

Beginning at the mouth of South Fork, the river for the first six miles is about 125

feet wide, varies in depth from 2 to 5 feet, has a moderate current, no abrupt bends, and few obstructions. We here reach Ollinger's Mill-dam, with a fall of about 6 feet. From this point a marked change takes place in the character of the river; the channel becomes contracted; the shoals and rapids are greatly multiplied, the fall being much greater; many short and abrupt bends occur, with perpendicular, jagged limestone cliffs opposite the points; great numbers of boulders have fallen from the bluffs and lie strewn along the bed; numerous islands obstruct the water-way, dividing it into very narrow channels; and, within a distance of twenty-five miles, five mill-dams are met with, having an aggregate fall of 30 feet. Boats have never run on this portion of the river, as far as I could learn. The affluents are small, making it appear that the mills are a necessity in their present position. A large amount of money would be required to clear out the obstructions and build aprons to the dams, and if all other obstacles were removed, the current is so rapid and the bends so sharp that I think few persons would be found bold enough to trust their property to be carried over this part of the river. The farmers living on the upper part find ready sale for their surplus productions to the citizens of Wise, and those living lower down can easily haul their produce eight or ten miles to Shaver's Ford.

In view of these facts, I have not included Section I in my estimate; but have considered Shaver's Ford as the proper head of navigation.

From Shaver's Ford, the beginning of Section II, the river is still rather narrow for eight or ten miles; but the current is much less rapid, very few islands are met with, the bends are more gradual, and few obstacles are found. Fifteen or twenty boats leave here annually. The river gradually widens and deepens until we reach White Shoals.

At this point the river turns more to the west and runs more nearly through the center of the valley. To the mouth of Hoop Creek it is broad and deep, with little current; the shoals have inconsiderable fall, except at a few places, notably the Bag-string and Parrett's Chute; the bends are very gradual and sweeping, and for almost the entire distance we have a beautiful river.

From Hoop Creek to its junction with Clinch the river is still broad, but not so deep; the fall becomes greater than in the last section, with an almost continuously brisk current, which at times becomes rapid; the islands are more numerous and the navigation more dangerous.

Powell's River, running as it does through the mountains, is necessarily very tortuous, bends occurring at every few hundred yards, and sometimes, as at Nevel's Shoals, after running a distance of three miles, returns so nearly upon itself that the space across the neck is only a few hundred feet.

OBSTRUCTIONS.

In 1845 the State of Tennessee expended within her limits about \$7,000 in the removal of some of the most dangerous rocks and fish-dams, and in building wing-dams at some of the islands and shoals.

A considerable amount of work was done, and the navigation was greatly improved. The boatmen in Virginia banded together a few years ago and removed some of the most dangerous obstacles, thus showing a disposition to help themselves. Still, much remains to be done. Large masses of rock have become detached from the cliffs and fallen into the river; fish dams and traps have been rebuilt in defiance of law, and the wing-dams, originally built of the round boulders found in the river, and on too small a scale, have in most cases been entirely destroyed by drift-logs and the current.

The obstructions now found in the river may be classified as follows:

Ledges of rock running across the river, and showing sharp points above low water.

Large boulders that have fallen from the bluffs.

Shoals of smaller boulders and gravel.

Islands dividing the water-way into narrow channels.

Rocky points extending into the river at the bends, and mostly covered with small trees and brush.

Leaning trees and hanging limbs; snags.

Fish dams and traps.

Mill-dams.

PLAN OF IMPROVEMENT.

The ledges of rock which cross the river in very many places are mostly limestone: some sandstone was found. These ledges have points more or less sharp, projecting above ordinary low water to the height of a foot or more, and are very dangerous; they should be broken down by the hammer and wedge, or by blasting to the low-water mark.

The large boulders have fallen from the cliffs, loosened by the action of water and frost, and lie scattered along the whole length of the river. These should be broken

up with powder, and the fragments removed to the bank, except when they fall into deep water.

The larger bowlders (those that show above ordinary low water) found on the shoals should be moved out of the channel; this can readily be done by hand. At most of the islands and some of the shoals, as at Potut's Island, Farley's Shoals, Parrett's Chute, mouth of Mulberry, Hook Creek, Nevel's Shoals, Cox's Shoals, Jack Nantz's Shoal, Island Ford, Bradin's Shoals, Baker's Tow-head, Ridenhour's Island, and Poor Horse Island, wing-dams should be built to turn the water into the boating channel.

Many of the points at the bends project into the river, lessen the water-way, and force boats to make too wide a circuit, thus rendering them liable to be thrown on the opposite bank below. Their removal would greatly lessen the dangers of navigation.

Leaning trees and hanging limbs are found at almost all the points, and on many of the stretches, especially in the upper river. Their removal is a necessity. The trees should be felled, trimmed of their branches, and then cut up into pieces 10 feet in length, to be borne off by the tides and deposited out of the way of boats.

Snaags are frequently found, especially in the lower river. Almost all persons in clearing the banks merely cut the trees, allowing them to fall with tops in the water, the butts resting on the land, and to remain in this condition until the first rain-tide swings them off. The whole trees float slowly down the stream, to be caught probably on the first shoal or in the first eddy, and form dangerous snaags. These should be removed, and it should be made imperative on all persons cutting trees into the river to lop off all the limbs, and cut the trunks into lengths not exceeding 10 feet, so that when the water rises, the parts would separate and be deposited where they could do no harm.

In the most dangerous class of obstructions must be placed fish-dams and traps, generally built by irresponsible and ignorant persons having a total disregard for the rights and the safety of the property of others. The traps are often placed in the best boating channel; and being built and repaired in low-water season, boatmen have no means of knowing where they are until a fatal accident occurs. I found no less than sixty-five traps, old and new, in the navigable portion of the river. Boatmen generally prefer one of the several chutes around islands and over shoals, but it is not always possible to choose; the wind may blow them off, or an oar may break in working into the proper position to enter the selected channel, and it may then be necessary to run the other, which should be unobstructed as far as possible. Hence all dams and traps should be removed, and it should be made a penal offense for any person to build another one in any part of the river.

I found three mill-dams in partial decay, and one in repair below Shaver's Ford. The latter is attached to a saw-mill belonging to Mr. Frank Holliday, in Lee County, and has a fall of four feet. Mr. Holliday was not at home, but I learned the dam was erected about 1872, twenty-five years after the river was first used for boating purposes. The mill is a mere frame structure and the business moderate. I learned also that suit was brought to compel its removal, and Holliday had given bond in the sum of \$5,000 to make good any loss that may be caused by its erection. No accident has occurred, for the simple reason that boatmen prefer to wait for a high tide, to running any risk, as it is more than probable that should a boat be broken up on it, long and vexatious litigation would result before damages could be recovered. I saw but one man who spoke of it with favor, and he lives and does business below the dam. Of course it does not interfere with his operations. I spoke to several boatmen on this subject, and all told me they approach it at all times with dread, and thank their good fortune when it is passed in safety. There is a considerable fall just below the dam, and the water is drawn off rapidly, thus rendering it more dangerous.

I recommend its removal, for it seems to me useless to spend money on minor obstructions and leave the most serious one intact.

I would recommend that landing-places be prepared for boats every six or eight miles. These landings would be a great convenience—in fact, are a necessity, for boats are sometimes lost in attempting to land at unsuitable places on the approach of night or during high winds. I would merely select some soft bank, where there is eddy-water, and remove the trees, brushes, stumps, &c., for an area of say 150 feet long by 20 feet wide. This would be ample; for as each boat arrives it could be brought to the bank, stopped, and then dropped down the stream, making room for others that might follow. In the present condition of the river, boats frequently have to stop an hour or two before sundown, or run after night, which is always attended with danger, to find a suitable landing-place. The cost would be a mere trifle.

COST OF IMPROVEMENT.

In estimating the cost of improvement I think it best to consider the amounts required in the two States separately.

Estimate of cost of improving Powell's River in Virginia, for high-water navigation by flat-boats, a distance of about forty miles.

Removing ledges	\$100
Removing large bowlders	500
Removing small bowlders from shoals	350
Removing rocky points, and cutting leaning trees and hanging limbs	1,000
Removing fish dams and traps	200
Removing mill-dams	750
Removing snags	50
Building wing-dams, 500 cubic yards	1,500
Cutting trees and grubbing, for landings	50
	4,590

Estimate of cost of improving Powell's River in Tennessee for a distance of about one hundred and twenty miles.

Removing ledges	\$1,430
Removing large bowlders	1,320
Removing small bowlders from shoals	750
Removing rocky points, and cutting leaning trees and hanging limbs	540
Removing fish dams and traps	200
Removing snags	250
Removing mill-dams	50
Building wing-dams, 3,520 cubic yards	10,560
Cutting trees and grubbing, for landings	200
	15,410

Summary.

Estimate of cost of improvement in Virginia	\$4,590
Estimate of cost of improvement in Tennessee	15,410
	20,000
Contingencies, 10 per cent.	2,000
Engineering and supervision	2,000
Total cost	24,000

RESOURCES OF THE COUNTIES CONTIGUOUS TO POWELL'S RIVER.

The country drained by Powell's River and its tributaries is rich and productive, embracing some of the finest farming-lands in the Southwestern Virginia and North-eastern Tennessee. Wheat, corn, oats, bacon, and other farm-products are shipped annually in large quantities: not less than one hundred and twenty-five flat-boats, with cargoes valued at from \$800 to \$5,000, come out of Powell's River every winter and spring. Pig-iron is shipped from the Cumberland Gap furnace to Chattanooga by this route. Valuable timber is found on the whole length of the river; large quantities are rafted out every year. Coal is found in abundance, but no effort has been made to ship it, in consequence of high rates of freight.

The following table is made from the census returns of 1870, and shows in part the productions of the counties along the river:

Counties.	Popula- tion.	Wheat.	Corn.	Oats.	Potatoes.	Wool.	Tobacco.
		<i>Bush.</i>	<i>Bush.</i>	<i>Bush.</i>	<i>Bush.</i>	<i>Lbs.</i>	<i>Lbs.</i>
Lee, Virginia	13,268	81,600	368,000	67,000	18,200	21,800	(*)
Hancock, Tennessee	7,148	22,900	204,000	41,300	13,900	13,900	9,972
Claiborne	9,321	33,900	205,000	59,000	15,000	15,300	4,827
Union	7,605	29,600	168,600	69,800	(*)	10,600	14,169
Campbell	7,445	18,400	127,000	65,200	12,500	12,000	8,509
Anderson	8,704	22,900	263,000	73,000	22,000	13,000	15,572
Totals	53,491	209,300	1,335,600	375,300	81,600	86,600	53,061

* Not given.

From extended inquiries I am inclined to think the production of cereals has greatly increased in the last two or three years.

REASONS FOR THE IMPROVEMENT.

The people living in Powell's Valley are literally surrounded by mountains, except to the southward. They have the Cumberland Mountains on the west, Wallen's Ridge and Clinch Mountains on the east, and the high watershed which divides the waters of Powell's River from those of Sandy on the north. There are no railroad facilities; wagon transportation east, north, or west is entirely out of the question, and they are absolutely dependent on Powell's River for an outlet to market. Neither Virginia nor Tennessee is able to undertake any plan looking to the improvement of the river, and the people have helped themselves as far as they are able. In the present condition of the river five and six feet rain-tides are necessary to enable boats to make the trip down, and the annual loss of property is something over 6 per cent. It sometimes happens that only two or three of these boating tides occur during the season, consequently much produce is left in the country, to the great loss of farmers, for every man cannot build and run a boat. If the suggested improvements are made, boats could run out on 3½ or four feet tides with less danger than now threatens, the season of navigation would be prolonged, and advantage taken of a favorable market.

W. M. GORDON,
Assistant Engineer.

Maj. WALTER MCFARLAND,
Corps of Engineers.

EXAMINATION OF CLINCH RIVER FROM THE MOUTH OF INDIAN, IN TAZEWELL COUNTY, VIRGINIA, TO THE JUNCTION OF CLINCH AND POWELL'S RIVERS, TENNESSEE.

This report covers also the examination of the remaining part of the Clinch River, extending from the mouth of Powell's River to the Tennessee River, a distance of about one hundred and six miles, ordered by the same act of Congress, in the clause directing the examination of Powell's River.

From the mouth of Indian Creek, which it receives from the north, in Tazewell County, Virginia, the Clinch River flows in a southwesterly direction for nearly four hundred miles to its junction with the Tennessee River; one hundred and sixty-five miles of its course lying in the State of Virginia, and two hundred and thirty miles of it in the State of Tennessee.

Powell's River enters it from the north at a point about one hundred and six miles above its mouth.

Like Powell's River, the Clinch is almost surrounded by ridges and spurs of the Cumberland Mountains, which render its valley almost inaccessible; and the general characteristics of the two streams and of the regions through which they flow are the same.

The Clinch, like Powell's River, is narrow, crooked, made up of pools and shoals, and obstructed by rocky ledges and points, bars and shoals of gravel, scattered boulders, snags, mill-dams, fish-traps, and overhanging trees.

It has the same seasons of high and low water, the boating tides occurring only in the winter and spring months, with the same irregularity and uncertainty as in Powell's River, and with the same consequent injury to the farmers when these tides are not numerous enough to enable them to remove their entire crops.

The valley is equally fertile and rich in resources, the value of its farm-products annually exported being about \$2,000,000. Over one hundred and fifty flat-boats, with cargoes ranging from \$1,000 to \$5,000 in value, annually descend the Clinch on boating tides of five or six feet. The upper part of the river, from the mouth of Indian Creek, in Tazewell County, Virginia, to Nash's Ford, in Russell County, Virginia, a distance of seventy-five miles, is not susceptible of improvement.

Laden flat-boats have passed down from Nash's Ford to Kingston, on the Tennessee River, at the mouth of the Clinch, a distance of three hundred and twenty miles; but Osborn's Ford, in Scott County, Virginia, fifty-five miles farther down and thirty-five miles by river from the boundary-line between Virginia and Tennessee, is regarded as the head of high-water navigation on the Clinch. It has no low-water navigation. No part of the river can be fitted for low-water navigation except, perhaps, the part lying below Walker's Ferry, in Grainger County, Tennessee, one hundred and forty-five miles above the mouth of the Clinch. It is possible that from here to Clinton, a distance of seventy-four miles, a low-water depth of $1\frac{1}{2}$ feet, and from Clinton to the mouth, a distance of seventy miles, a low-water depth of 2 feet, might be secured; but this question can be settled only by making a careful survey of this part of the river. At present there appears to be no necessity for any such improvement, even if it be found practicable to make it.

All that can or should be done, then, for the present, is to improve the high-water navigation of this river, so that there shall be less difficulty and danger in bringing out cargoes, and so that rain-tides of 3 or 4 feet may be made use of for boating purposes.

This can be done by breaking off the points of rocky ledges, blasting and removing the bowlders which are in the way of boats, deepening the channels over some of the bars, removing fish-traps, mill-dams, snags, and overhanging trees, and contracting the channel occasionally by the use of wing-dams. This improvement should begin at Nash's Ford, and should extend to the mouth of the Clinch, three hundred and twenty miles.

The estimated cost of it is as follows:

Nash's Ford to the boundary-line between Virginia and Tennessee, ninety miles	\$14, 100
Boundary-line to mouth of Clinch, two hundred and thirty miles	21, 120
	35, 220
Contingencies, &c., 25 per cent.	8, 805
Total	44, 025

For further information as to the examination of this river, reference may be made to the report of Assistant Engineer William M. Gordon, which is sent herewith:

REPORT OF MR. WILLIAM M. GORDON, ASSISTANT ENGINEER.

Having completed the field-work on Powell's River July 14, I immediately started for the mouth of Indian, in Tazewell County, Virginia, to begin the examination of the Clinch; but the floods of July occurring, it was not until the 9th of August that the river was sufficiently low and clear for the work to be commenced. The trip down the river was made in a canoe guided by two men. Clinch River rises in Tazewell County, Virginia, and flowing southwest through Russell and Scott Counties enters Hawkins County, Tennessee, and continuing the same general course passes through or touches Hancock, Claiborne, Grainger, Union, Campbell, Anderson, Knox, and Loudon Counties, and empties into the Tennessee River at Kingston, in Roane County. Its principal affluents are Indian, Bull Creek, Guest's River, Strong Creek, North Fork, Sycamore Creek, Powell's River, Poplar Creek, and Emery's River on the north, and Maiden Spring Fork, Big Cedar Creek, Copper Creek, Big War Creek, and Bull Run on the south. Many smaller streams flow in from either side. For convenience of description and reference the river may be divided into four sections.

Section I includes that part from the mouth of Indian, in Tazewell County, to Nash's Ford, in Russell County, Virginia, a distance of about seventy-five miles.

Section II extends from Nash's Ford to Osborn's Ford, in Scott County, Virginia, about fifty-five miles.

Section III embraces that portion from Osborn's Ford to Walker's Ferry, in Grainger County, Tennessee, a distance of about one hundred and twenty miles.

Section IV includes the remaining part of the river to Kingston, about one hundred and forty-five miles.

In the upper portion of section I the river is narrow and shallow, nothing more than a large creek. Receiving the Maiden Spring Fork and other streams, it increases in size and assumes a bolder character; the fall becomes much greater, the bends very abrupt, and in many places where the river passes around the north end of Copper Ridge, the water dashes over the ledges and down the falls with the force and rapidity of a mountain-torrent, entirely precluding the possibility of safe navigation.

At Nash's Ford, which is about six miles north of Lebanon, the county-seat of Russell County, a great change takes place; the river becomes broad, the pools long and deep, with little current, the fall on the shoals moderate, the bends are gradual, and for forty miles we have a fine stream. The first obstruction of any importance is "The Falls." This is a ledge of rock crossing the river at the foot of a large pool; it crosses at an angle of about 45° and has a fall of 3 feet. The current is not rapid either above or below, and the water is not drawn off rapidly. Persons living near told me that during what would be called a moderate boating tide no great disturbance is occasioned by it. It can be easily improved for navigation. The next obstacle of importance is at Hanging Rock Falls. The river here is impeded by very large masses of rock that have fallen from the cliffs on either side; the removal of these to low-water mark would make it entirely safe, the fall being nowhere abrupt and only about 2 feet in 100 feet, with eddy-water below.

The river now becomes narrower and rougher, having Pine Ridge on the left and the Bull Creek Hills on the right. For a distance of four or five miles the pools are shorter, the fall on the shoals is much greater, the current in some places being very rapid; large boulders are numerous, and rock-points jut out into the river, but there are no abrupt bends such as occur in the upper river, and no physical conditions exist to prevent its improvement for safe navigation. Mr. Samuel Nash, who lives near Nash's Ford, told me his father, about 1820, sent from that point two flat-boats loaded with corn to Kingston, and in 1824, when his death occurred, was preparing to build four others to make the same trip.

Several families have moved from Russell County to the West via the Clinch and Tennessee Rivers, thus showing that this portion of the river in its unimproved condition has been used with success. To Osborn's Ford the river is in good condition. The improvement of this section would give easy and cheap outlet to a large and productive portion of Russell County, now practically cut off from market. Osborn's Ford, in Scott County, is practically the head of navigation. For the first fifty miles of this section the river is generally broad and deep, with few shoals and little fall, except at "The Rounds" and over Rogers's Shoals. Then for thirty miles it passes between Copper Ridge on the left and Chestnut Ridge on the right, and is known as the Thirty-mile Shoal. The river through the ridges is still wide, but not so deep as above, and has more fall, but no obstacles of a serious character are found. After passing the ridges the river widens and deepens and the fall becomes less to Walker's Ferry.

From Walker's Ferry to Kingston there is the usual succession of pools and shoals; a greater number of islands is seen, but no very serious obstructions are met with.

In 1845, the State of Tennessee expended \$10,000 in improving Clinch River from the State line to its mouth, but the work was not thoroughly done. Many boulders have fallen in since or were not moved at the time, fish-traps and mill-dams have been built, the wing-walls erected have been washed away, and at present the estimated amount of money could be very profitably expended. In 1872, the legislature of Virginia granted a charter to the Clinch River Improvement Company, but gave no money. About \$1,000 have been expended by the company within the limits of the State, and much good has been accomplished.

Only one mill-dam was found between Nash's and Osborn's Fords. This is at Ruin Island, about two miles above the latter place, and is a mere loose-rock structure. From Osborn's Ford to the Tennessee line there are two mill-dams belonging to George Craft and Claiborne Neeley, respectively. Craft's dam is located at the head of a shoal, is from one and a half to three feet high, and runs partly across and down the stream; it supplies water for a grist and saw mill built about thirty years ago. Business moderate. Neeley's mill is a small sash-saw affair built about four years ago. The Clinch River Improvement Company tore down a portion of the dam two years ago, but last winter a boat loaded with grain was lost by striking upon it. Suit was instituted by the owners, and the value of the boat was recovered; another suit for the recovery of the value of the grain is still in progress. This dam is very dangerous, being built at the head of a bad, rocky shoal, with considerable fall, and from which the water is drawn off rapidly. In Tennessee two small dams were passed.

The obstructions found in the Clinch are of the same character as those noticed in Powell's River.

The same classification and the same plan of improvement may be adopted, and it only remains to estimate the cost of removal.

Estimate of cost of improving Clinch River for flat-boat navigation at high water, from Nash's Ford, in Russell County, to Osborn's Ford, in Scott County, Virginia, a distance of about fifty miles.

Removing ledges.....	\$1,970 00
Removing large boulders.....	2,630 00
Removing smaller boulders from shoals.....	585 00
Removing rock points and cutting leaning trees and hanging limbs.....	2,660 00
Removing fish traps and dams.....	80 00
Removing snags.....	50 00
Removing mill-dam.....	25 00
Building wing-dams.....	4,960 00
Cutting trees and grubbing, for landings.....	30 00
	12,990 00

Estimate of cost of improving Clinch River from Osborn's Ford to the Tennessee line, about thirty-five miles.

Removing ledges.....	\$10 00
Removing large boulders.....	245 00
Removing smaller boulders from shoals.....	75 00
Removing rocky points and cutting leaning trees and hanging limbs.....	10 00
Removing fish dams and traps.....	30 00
Removing snags.....	60 00
Removing mill-dams.....	650 00
Cutting trees and grubbing, for landings.....	30 00
	1,110 00

Estimated cost of improving the Clinch River from the Tennessee line to Kingston, about two hundred and thirty miles.

Removing ledges.....	\$650 00
Removing large boulders.....	1,200 00
Removing smaller boulders from shoals.....	150 00
Removing rocky points and cutting leaning trees and hanging limbs.....	100 00
Removing fish traps and dams.....	300 00
Removing snags.....	500 00
Removing mill-dams.....	120 00
Building wing-dams.....	17,850 00
Cutting trees and grubbing, for landings.....	250 00
	21,120 00

Summary.

Estimate of cost from Nash's to Osborn's Ford, 55 miles.....	\$12,990 00
Estimate of cost from Osborn's Ford to Tennessee line, 35 miles.....	1,110 00
Cost in Virginia.....	14,100 00
Cost in Tennessee.....	21,120 00
Contingencies, 10 per cent.....	35,220 00
Engineering and supervision.....	3,520 00
Total cost.....	40,740 00

The following table, compiled from the census returns of 1870, shows some of the productions of the counties contiguous to Clinch River:

Counties.	Popula- tion.	Wheat.	Corn.	Oats.	Potatoes.	Wool.	Tobacco.
		<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Russell, Virginia.....	11,103	41,000	206,000	56,000	9,000	27,000	17,222
Scott, Virginia.....	13,036	53,600	222,000	68,700	13,000	24,200	16,557
Hawkins, Tennessee.....	15,837	138,900	466,500	112,300	18,800	26,100	12,370
Grainger, Tennessee.....	12,421	78,100	153,300	86,000	20,300	16,000	16,646
Roane, Tennessee.....	15,622	74,800	504,600	112,000	24,400	14,000	350
London, (new county).....							
	68,019	386,400	1,552,400	435,000	85,500	107,300	63,205

The same reasons may be urged for the improvement of the Clinch as were given in my remarks on Powell's River. Clinch Valley runs parallel with Powell's Valley, and is in like manner inclosed by mountains, and all produce must seek a market by Clinch River.

About one hundred and fifty flat-boats come out of Clinch River annually, and there is a loss of about 6 per cent. from accidents. A large number of rafts are also brought down, but even an approximate estimate of the quantity of lumber produced cannot be made for want of proper data. Coal and iron abound.

W. M. GORDON,
Assistant Engineer.

Major WALTER MCFARLAND,
Corps of Engineers.

EXAMINATION OF CLINCH RIVER BELOW THE MOUTH OF EMERY'S RIVER, AND EMERY'S RIVER ABOVE ITS MOUTH, (FOR THE REMOVAL OF BARS,) TENNESSEE.

Emery's River is a small stream which flows from the north and enters the Clinch River four miles above its mouth.

Barton's Landing, seven miles and a half above the mouth of Emery's River, is the head of navigation, although on very high rain-tides steamers have sometimes passed up to Emery's Gap, four miles above, where the Cincinnati Southern Railroad, now in course of construction, is to bridge the river. Above Barton's Landing there are numerous falls in the river. Below it there are many bowlder-bars, with from six to twelve inches of water over them. If the river were improved by giving it channels 60 feet wide and 2 feet deep, it would be necessary, in order to make them available, to construct a wing-dam 800 feet long in the Clinch River, below the mouth of the Emery's. The estimated cost of this work would be—

Improving channels	\$10, 500
Wing-dam in Clinch	3, 600
	14, 100
Contingencies, &c., 25 per cent.....	3, 525
Total	17, 625

There appears to be no good reason for undertaking this improvement. An iron-furnace was constructed some years ago at Oakdale, with a landing on the river about five miles from the mouth, but it has never been used—at least, it has produced no iron.

The valley does not appear to be a very productive one, and such produce as it sends out is readily carried over good roads to Kingston, on the Tennessee, only seven miles and a half distant from Barton's Landing.

No public interest demands the improvement.

For details of the examination of this river, see the report of Assistant Engineer W. M. Gordon, herewith.

REPORT OF MR. WILLIAM M. GORDON, ASSISTANT ENGINEER.

In connection with Clinch River, it was made my duty to examine Emery's River for the removal of bars.

Emery's River rises in Morgan County, Tennessee, and, flowing southeast, empties into the Clinch about four miles above Kingston; Little Emery is the principal affluent. Barton's store and landing, seven and a half miles above the mouth, and about the same distance by wagon-road from Kingston, may be considered the head of navigation, as at this point there is a fall of 1 foot perpendicular, with numerous shoals and

falls above. On very high tides, steamers go to Emery's Gap, four miles above, but the river is narrow and crooked. Such trips are not frequent. The Cincinnati Southern Railroad will cross the river at the gap.

At Cooper's Landing, one and a half miles below Barton's, is a store and hotel, with a few scattering houses. Oakdale Landing, half a mile below Cooper's, has a store-house and one dwelling. The current of Emery's River below Barton's Landing is very sluggish; in fact, except at two places, it is hardly practicable. The water in the pools is from 6 to 15 feet deep. Numerous bars rise suddenly from the deep water, and as suddenly disappear. These bars are composed of rounded bowlders, from 6 to 18 inches in diameter, though near the mouth much larger ones are found. One bar is 200 feet long, with only 6 inches of water on it; another is 370 feet long, with an average of 8 inches; and others from 20 to 250 feet in length, with 1 foot of water at low summer stage.

Ledges of rock cross the river at various points, but nowhere approach the surface nearer than 2 feet, except at the mouth of Little Emery and at a point about 600 feet below. At the former place the bar is of stratified limestone, 95 feet long, extends entirely across the river, and has only 6 inches of water on it. At the latter place the bar is 140 feet long, and has a channel depth of 18 inches. My estimate of cost is based on giving a low-water channel 60 feet wide and 2 feet deep. Should greater depth be required the cost would be largely increased, as many bars and ledges not included in the present estimate would have to be considered. To enable boats to reach the mouth of Emery's River a wing-wall about 800 feet long would have to be built on the shoals, below Green's Ford, on Clinch River.

Estimate of cost of improving Emery's River from Barton's Landing to its junction with Clinch, and Clinch River from the mouth of Emery's to the Tennessee River, to give 2 feet of water at low summer stage 11½ miles.

Removing ledges, 510 cubic yards, at \$10.....	\$5,100
Removing bars, 5,300 cubic yards, at \$1.....	5,300
Removing rocky points.....	75
Removing leaning trees and hanging limbs.....	25
Building wing-wall in Clinch River, 1,200 cubic yards, at \$3.....	3,600
	14,100
Contingencies, 10 per cent.....	1,400
Engineering and supervision.....	1,000
Total cost.....	16,500

Emery's Valley does not seem to be very productive, and, from all I could learn, no great amount of produce is shipped. There has been greater activity on the river this season than usual in the transportation of supplies for the contractors on the Cincinnati Southern Railroad, but this demand is only momentary.

About one mile from Barton's Landing are several coal-mines, having a tram-way to the river, but no special activity was observed. Several years ago a large iron furnace was erected about four miles from Oakdale Landing, but has produced no iron.

In view of the fact that the whole of Emery's Valley has easy access by wagon-transportation to Kingston and a market, and that only very limited interests are involved, I cannot recommend the improvement of Emery's River.

CONCLUDING REMARKS.

In your communication of June 22, above referred to, I find the following:

"You will observe that in the instructions relating to the examination of the Hiwassee and Little Tennessee Rivers, a channel depth of 3 feet at low water is spoken of. This is the depth which is being secured for the Tennessee, and if it were possible it would be well to secure it for all the branches of the Tennessee; and this you will please bear in mind in making your examinations and report upon the possibility of securing this depth in the Clinch, Emery's, and Powell's Rivers, or the possibility of securing a depth of 2½ feet or 2 feet, or 1½ feet at low water. Report also on the probability or improbability of securing slack-water navigation on these rivers, and whether it is worth while to attempt a survey for this purpose."

My report on Emery's River covers these points so far as that river is concerned.

The fall in the lower portion of Powell's River is too great, and the supply of water in the summer and fall too limited, for low-water navigation, and, indeed, I see no necessity for attempting to secure it.

From Walker's Ferry to Clinton a depth of 1½ feet, and from Clinton to Kingston a depth of 2 feet at low water *might* be secured; but this fact can only be definitely

determined by an elaborate survey, involving the frequent gauging of the river and making numerous soundings on the shoals.

The accomplishment of any plan of improvement looking to this result could only be secured by a large expenditure of money, and its necessity is not apparent, though I was told that large timber used in the construction of flat-boats is becoming scarce along this portion of the river.

Clinton, the only town on any of these rivers, is connected with Knoxville by the Ohio and Knoxville Railroad. The railroad bridge over the Clinch at Clinton is a simple Howe truss of four spans, two of 150 feet and two of 120 feet each; the bottom chord is about 51 feet above low water. It has no draw.

Slack-water navigation could be secured on the Clinch, but the interests involved do not seem to justify the expense, and I see no necessity for making a survey with a view to such improvement.

W. M. GORDON,
Assistant Engineer.

Maj. WALTER MCFARLAND,
Corps of Engineers. .



COTTON CLAIMS.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

IN RESPONSE TO

A resolution of the House of March 14, 1876, transmitting statement of cotton claims presented and paid by Secretary of Treasury from January 1, 1865, to June 30, 1876.

AUGUST 10, 1876.—Referred to the Committee on Expenditures in the Treasury Department and ordered to be printed.

TREASURY DEPARTMENT,
August 7, 1876.

SIR: In response to the resolution adopted in the House of Representatives on the 14th of March last, requiring a list of all the cotton claims presented to and paid by the Treasury Department since January, 1865, &c., I have the honor to transmit herewith four tabular statements, marked, respectively, A, B, C, and D. Statement A contains a list of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868, when the balance of proceeds of captured and abandoned property was covered into the Treasury. Statement B contains a list of payments by the Treasury Department from March 30, 1868, to June 30, 1876, under sundry acts of Congress, on account of claims arising from the seizure of cotton. Statement C contains a list of awards of the United States Court of Claims for proceeds of captured and abandoned property under the act of March 12, 1863, presented to and paid by the Treasury Department up to June 30, 1876. Statement D contains a list of cotton claims allowed by the Secretary of the Treasury under the fifth section of the act of May 18, 1872.

A list had been prepared of claims presented to the Secretary of the Treasury under the act of May 18, 1872, and disallowed, with the grounds of rejection; but as it does not seem to be specifically required by the resolution, and regarding its publication as prejudicial to the public interests, and of value only to those interested in seeking and prosecuting claims against the Government, I have considered it my duty to retain it.

In reply to the further inquiries of the resolution, I have the honor to say: The Department has no definite information in regard to the manner of paying fees in such cases; the amounts paid or promised, being matters of private agreement, rarely come to the knowledge of the officers of the Department. The Department has no information concerning the existence of any combinations formed to defraud the Government in relation to such claims.

With great respect, your obedient servant,

LOT M. MORRILL,
Secretary of the Treasury.

Hon. MILTON SAYLER,
Speaker House of Representatives pro tempore.

COTTON CLAIMS.

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A.—List of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868.

Claimant.	Attorney.		No. of bales claimed.	Decision.	Date of decision.	Released.		Ground of decision, &c.
	Name.	Residence.				Bales.	Proceeds.	
W. W. Andrews, administrator of Isaac N. Jones.	Arkansas	Arkansas	135	Allowed	Apr. 7, 1866	.....	\$11,307 12	Erroneously seized as the property of confederate government.
A. H. Andrews et al.	Iowa	Washington, D. C.	28	do	Dec. 31, 1866	.....	3,164 86	Do.
W. W. Andrews, adm'r of Isaac N. Jones.	Lake Providence, La.	Washington, D. C.	28	do	Oct. 7, 1866	.....	1,316 27	Erroneously taken as abandoned. Brought in by military for owner.
S. J. Adams	Arkansas	Arkansas	91	do	Oct. 20, 1866	91	.....	Erroneously seized as the property of confederate government.
John A. Adams	La Fayette, Ark.	Washington, D. C.	8	do	Mar. 14, 1867	.....	16,458 70	Compensation for collecting.
Mrs. Indiana Bass	Louisiana	Washington, D. C.	20	do	Apr. 4, 1867	.....	452 00	Erroneously seized as confederate property.
Col. R. W. Barnard.	Tennessee	Washington, D. C.	83	do	Apr. 8, 1867	.....	13,151 39	Erroneously seized as abandoned.
Brett & Davis.	Louisiana	Cincinnati, Ohio	19	do	Jan. 25, 1865	.....	6,009 66	Erroneously seized.
J. W. Black.	Iowa	Tennessee	22	do	May 8, 1865	.....	4,514 45	Seized for supposed violation of regulations.
O. H. Brewer & Co.	Tennessee	Iowa	55	do	June 22, 1865	.....	28,201 28	Erroneously seized.
John Blevins	Tennessee	Iowa	13	do	Aug. 15, 1865	.....	1,048 63	Brought in by military for owner.
Brown & Walker	Savannah, Ga.	Tennessee	607	do	Sept. 13, 1865	52	.....	Seized as property of confederate government; released by order of the President.
William Battersby & Co.	Louisiana	Cincinnati, Ohio	45	do	Dec. 14, 1865	.....	437 92	Erroneously collected under section 8, act of July 2, 1864.
R. H. Brownrigg.	Mississippi	New York	189	do	Mar. 3, 1866	607	.....	Erroneously seized as blockade cotton.
H. H. Beard	Mississippi	do	322	do	Mar. 17, 1866	.....	7,507 86	Abandoned property.
David Barrow	Memphis, Tenn.	Mississippi	9	Rejected.	Mar. 21, 1866	.....	56,904 73	Erroneously seized as abandoned.
Brooks & McClelland	Georgia	Cincinnati, Ohio	322	Allowed.	Apr. 19, 1866	332	.....	Under contract for collecting; (\$31,112.55 of amount allowed paid February 16, 1874.)
Beall & Metcalf.	Louisiana	Washington, D. C.	266	do	May 9, 1866	266	.....	Improperly seized.
Mrs. E. D. Bachelor.	Mississippi	Mississippi	45	do	May 12, 1866	.....	7,092 93	Erroneously seized as abandoned.
M. T. Bonham	New York	Mississippi	59	do	May 18, 1866	.....	14,222 23	Erroneously taken as abandoned.
William Bryce & Co.	Memphis, Tenn.	New York	30	do	May 24, 1866	30	.....	Erroneously seized.
Brooks & McAllister	Louisiana	Hamilton & Brooks.	31	do	May 26, 1866	31	7,716 80	Under contract for collecting; (\$3,203.20 of amount allowed paid February 16, 1874.)
Madam Bertinatti	Louisiana	Cincinnati, Ohio	16	do	June 8, 1866	.....	16,200 00	Proceeds of cotton taken by military; ordered paid by President.
H. Burkenroad	Alabama	Alabama	3	do	Sept. 17, 1866	.....	2,216 82	Erroneously collected under section 8, act July 2, 1864.
W. Brannan et al.	Alabama	Alabama	3	do	Sept. 18, 1866	.....	244 21	Erroneously seized.

A.—List of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868—Continued.

Claimant.		Attorney.		No. of bales claimed.	Decision.	Date of decision.	Released.		Ground of decision, &c.
Name.	Residence.	Name.	Residence.				Bales.	Proceeds.	
Brown & Walker		T. H. Yeatman	Cincinnati, Ohio	4	Allowed	Oct. 18, 1866		\$627 65	Erroneously collected under section 8, act July 2, 1864.
John Blevins	Tennessee			32	do	Nov. 9, 1866		4, 800 00	Seized as property of confederate government; released by order of the President.
Carson & Jones				6	do	Jan. 26, 1865		945 75	Extra riot in transporting Government cotton.
A. H. Collister	Georgia	James Kennedy	Michigan	73	do	May 30, 1865		31, 486 84	Adjusted under purchasing regulations.
B. F. Camp	New York	Chipman & Hooper	Washington, D. C.	115	do	Dec. 6, 1865		30, 000 00	Compensation for collecting.
M. Cummings, executor of Van G. Foote.	Georgia	J. Gill Shorter	Alabama	50	do	Apr. 11, 1866	115		Erroneously seized as blockade cotton.
Mrs. Mary Cassin	Alabama			160	Rejected	Apr. 11, 1866		7, 222 53	Erroneously seized.
A. C. Cloud	Georgia	S. V. Niles	Washington, D. C.	(*)	do	May 9, 1866			Property of confederate government.
George H. Cheever, executor	Georgia	G. H. Cheever	New York	129	do	May 12, 1866			Evidence of receipt insufficient.
J. E. Campbell				4	Allowed	June 20, 1866		758 60	Seized as blockade cotton.
Carri, Glen & Wright		S. W. Williams	Washington, D. C.	52	do	July 16, 1866			Compensation for collecting.
Carri & Co.		C. L. Sayre	Alabama	36	Rejected	Oct. 30, 1866		5, 544 08	Erroneously seized.
A. F. Crawford	Alexandria, Va.	C. R. Beatty	Texas	107	Allowed.	Nov. 16, 1866	107		Captured property.
Cohen & Horitz	Georgia			54	do	Nov. 16, 1866			Erroneously seized as confederate property.
Miss S. Camp	Georgia	Ewing & Hollen	Washington, D. C.	25	Rejected	Dec. 15, 1866	54		Improperly seized.
W. B. Coffey	Texas	Fayette Smith	Cincinnati, Ohio	96	Allowed	Jan. 7, 1867		1, 163 46	Insufficient proof.
Temple Clark	Tennessee	Stanley Mathews	do	38	do	Jan. 7, 1867		9, 214 84	Compensation for collecting.
Henry Warren	do			90	do	Jan. 7, 1867		12, 910 84	Erroneously seized.
A. F. Crumr & Co.	Alabama	James Campbell	Philadelphia, Pa.	432	Rejected	Jan. 10, 1867			No proceeds in Treasury.
John Collins	Louisiana	L. R. Hull	Cincinnati, Ohio	900	Allowed	Sept. 24, 1867		737 23	Sold to confederate government.
W. M. Deason	North Carolina			1	Rejected	June 31, 1865			Erroneously seized.
L. De Belian				79	do	July 21, 1865			Captured property.
J. T. Douglas				98	Allowed.	Nov. 21, 1865			Abandoned property.
J. D. De Bow		J. Gill Shorter	Alabama	50	do	Apr. 7, 1866		3, 404 80	Property of confederate government.
J. H. Dent	Georgia			12	do	Apr. 17, 1866	50		Erroneously seized.
Joseph Day	Mississippi	T. H. Yeatman	Cincinnati, Ohio	1, 211	do	June 23, 1866		1, 501 77	Erroneously seized as subscribed to confederate government.
W. T. Duggett					do	Nov. 28, 1866		60, 099 80	Erroneously collected under section 8, act July 2, 1864.
Dwight & Gill					do				Adjusted under purchasing regulations.

John Duncan	Mississippi	John Duncan	Mississippi	3,484	do	Dec. 18, 1866	97,284 26	Salvage on captured cotton.
Dennistoun & Co.	New York	Edwards, Pierrepont	New York	3,000	do	Nov. 4, 1867	59,000 00	In compromise of claim for alleged blockade cotton.
S. De Bow & Co.	Tennessee	Browning & Ewing	Washington, D. C.	28	do			Improperly seized.
D. Dupree				80	Rejected			Sold to confederate government.
Sanford Erwin				214	Allowed	May 15, 1865	62,108 76	Adjusted under purchasing regulations.
W. H. Ennis	Louisiana	C. P. James	Washington, D. C.	33	do	May 20, 1865	8,036 31	Erroneously seized.
Mrs. A. F. Elliott	Louisiana	J. W. Leftwich	Memphis, Tenn.	25	do	Dec. 27, 1865	9,603 33	Erroneously collected as abandoned.
Mrs. L. Evans	Mississippi			3	do	Apr. 19, 1866	834 90	Erroneously collected under section 8, act of July 2, 1864.
H. Escoubas	Louisiana	J. H. Darling	New Orleans, La.	9	Rejected	Aug. 10, 1866		Military seizure.
William Edwards & Co.		C. E. Hovey	Washington, D. C.	12	Allowed	Oct. 5, 1866	1,130 98	Erroneously collected under section 8, act of July 2, 1864.
J. H. Echols	Mississippi	George Taylor	do	20	do	Feb. 20, 1867	962 28	Erroneously seized.
Mrs. M. W. Fort	Louisiana	S. V. Niles	do	77	Rejected	Jan. 11, 1866		Erroneously collected.
W. Freeman, assignee of J. Hart.	Louisiana			67	Allowed	May 17, 1866		Sold to confederate government.
P. A. Fennerty	Arkansas	George Taylor	Washington, D. C.	13	Rejected	July 10, 1866	7,611 68	Erroneously seized as confederate property.
Thomas D. Fletcher		B. D. Whitney	Mississippi		Allowed	Aug. 7, 1866	141 88	Military seizure.
E. H. Forsyth		J. R. Dillin	Nashville, Tenn.	11	Rejected	Oct. 13, 1866		Erroneously collected under section 8, act of July 2, 1864.
D. L. Ferguson		Hughes, Denygr & Peck.	Washington, D. C.	46	do	Nov. 13, 1866		Insufficient evidence.
Rev. Dr. Fuller	Maryland			57	Allowed	Dec. 5, 1866	3,507 02	Captured property.
Mrs. Susan Fletcher	Louisiana	Hughes, Denver & Peck.	Washington, D. C.	176	Rejected	Feb. 23, 1865		Received from military for owner.
Mrs. L. F. Gibson	Mississippi			13	Allowed	June 2, 1865	36,954 42	Captured property.
Grigg & Thing	do			13	do	July 13, 1865	7,469 80	Erroneously seized as abandoned.
Mrs. M. L. Graves	Alabama			58	do	Dec. 4, 1865	4,212 36	Seized through mistake.
F. M. Gilmer, Jr.	South Carolina	Browning & Ewing	Washington, D. C.	2,190	do	Feb. 27, 1866		Erroneously seized as confederate property.
Gibbes & Co.				2	do			Erroneously seized as blockade cotton.
B. F. & E. George	Louisiana	W. L. Sharkey	Mississippi	175	do	Mar. 10, 1866		Improperly seized.
Varins R. Gathier	do			262	Rejected	May 1, 1866		Military seizure.
Alexander Gassell	do	B. D. Whitney	do	4	Allowed	Aug. 7, 1866	640 97	Erroneously collected under section 8, act of July 2, 1864.
J. C. Greely	Florida	J. W. Price	Washington, D. C.	9	Rejected	Sept. 19, 1866		Condemned as prize.
W. R. Green		T. H. Yeatman	Cincinnati, Ohio	2	Allowed	Oct. 2, 1866	248 08	Erroneously collected under section 8, act of July 2, 1864.
W. H. Gill	Texas			22	do	Nov. 28, 1866	188 98	Erroneously seized as tithe cotton.
Juliet Glass	Mississippi	R. D. Whitney	Washington, D. C.	18	Rejected	Dec. 14, 1866		Military seizure.
S. G. Gosson	Arkansas	T. D. Lincoln	Cincinnati, Ohio	22	do	July 22, 1865		Captured property.
W. H. Harris	Louisiana	James & Esdo.	Washington, D. C.	112	Allowed	Oct. 19, 1865	19,953 85	Erroneously seized as abandoned.
W. H. Harris	Washington, D. C.			3	do	Mar. 30, 1866	19,953 85	Compensation for collecting.
J. F. Handcock, et al.	Tennessee	J. C. Guild	do	68	do	Mar. 31, 1866	6,321 39	Erroneously collected as abandoned.
R. C. Hume	Mississippi	T. W. Leftwich	Memphis, Tenn.	3	do	Apr. 19, 1866	683 07	Erroneously collected under section 8, act of July 2, 1864.
N. H. Harrison, estate.	Alabama			692	do	Apr. 27, 1866		Improperly seized.
Henry Hurt		J. Gill Shorter	Alabama	35	do	June 14, 1866	3,799 04	Erroneously seized.

*30,000 pounds.

COTTON CLAIMS.

A.—List of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868—Continued.

Claimant.		Attorney.		Bales claimed.	Decision.	Date of decision.	Released.		Ground of decision, &c.
Name.	Residence.	Name.	Residence.				Bales.	Proceeds.	
A. Hemphill.....	.....	J. Gill Shorter.....	Alabama.....	4	Allowed	June 14, 1866	.....	434 17	Erroneously seized.
H. B. Hawkins.....	.....	C. L. Sayre.....	Alabama.....	34	do	June 20, 1866	.....	403 18	Compensation for collecting.
Theodore J. Hughes.....	Alabama.....	S. L. M. Barlow.....	New York.....	39	do	July 16, 1866	.....	4, 163 06	Erroneously seized.
Thomas Hobson.....	England.....	.....	.....	62	do	July 16, 1866	.....	8, 331 05	Erroneously seized as confederate property.
W. Hays Harris.....	Louisiana.....	T. H. Yeaman.....	Cincinnati, Ohio.....	71	do	Sept. 8, 1866	.....	8, 491 82	Erroneously seized as abandoned.
Hughes, Denver & Peck.....	Washington, D. C.....	.....	.....	150	do	Sept. 17, 1866	.....	16, 884 05	Compensation for collecting.
David Hoxie.....	Arkansas.....	.....	.....	1	do	Oct. 25, 1866	.....	255 03	Erroneously turned over.
Hughes, Denver & Peck.....	Washington, D. C.....	.....	.....	.....	do	Apr. 25, 1867	.....	12, 808 00	Compensation for collecting.
W. F. Harrell.....	Louisiana.....	.....	.....	7	Rejected	Mar. 20, 1865	.....	1, 436 60	Sold to confederate government.
Ezra W. Ingles.....	Mississippi.....	J. W. Leftwich.....	Memphis, Tenn.....	50	Allowed	Apr. 19, 1866	.....	974 62	Erroneously collected under section 8, act of July 2, 1864.
Mrs. M. B. Irwin.....	.....	.....	.....	5	do	.....	.....	.....	Received from military as abandoned.
H. M. James et al.....	Giles County, Tenn.....	.....	.....	38	Rejected	Jan. 9, 1866	.....	.....	Erroneously seized as confederate cotton.
R. M. Jones.....	Choctaw Nation.....	Waterson & Crawford.....	Washington, D. C.....	700	Allowed	Mar. 9, 1866	700	.....	Captured property.
James River Manufacturing Company.....	Richmond, Va.....	E. B. Bentley.....	Richmond, Va.....	50	Rejected	Apr. 3, 1866	.....	.....	Sold to confederate government.
Thomas W. Johnson.....	Norube County, Miss.....	George Taylor.....	Washington, D. C.....	97	do	Apr. 9, 1866	.....	.....	Erroneously seized as property of confederate government.
J. H. Jarrott.....	South Carolina.....	.....	.....	63	Allowed	Apr. 19, 1866	63	.....	Adjusted under purchasing regulations.
Benjamin Jolly.....	Alabama.....	L. E. Parsons.....	Alabama.....	1, 172	do	Nov. 20, 1866	.....	71, 538 86	Adjusted under purchasing regulations.
Kellinger & Weatherby.....	Elizabeth City, N. C.....	.....	.....	4	do	Feb. 21, 1865	.....	1, 221 03	Erroneously seized.
Kahnweiler Brothers.....	Wilmington, N. C.....	.....	.....	85	do	Nov. 14, 1865	85	.....	Do.
H. S. Kimball.....	New York.....	.....	.....	118	do	Nov. 27, 1865	118	.....	Insufficient evidence.
Keen & Scott.....	.....	Lowery, Fransoli & Soren.....	New York.....	67	Rejected	Jan. 7, 1867	.....	.....	Seized as confederate property.
F. M. Kirksey.....	Eutaw, Ala.....	J. M. Baldwin.....	do.....	117	do	Mar. 24, 1868	.....	.....	Captured and blockaded property.
G. B. Lamar.....	Florida.....	.....	.....	948	do	Feb. 14, 1865	.....	.....	Erroneously seized.
J. M. Latta.....	Maryland.....	.....	.....	27	Allowed	May 18, 1865	27	1, 900 11	Do.
George W. Lane.....	Tennessee.....	.....	Washington, D. C.....	749	do	July 11, 1865	749	.....	Do.
Mrs. C. M. Locke.....	Macon, Ga.....	C. P. James.....	Washington, D. C.....	21	Rejected	Sept. 6, 1865	.....	.....	Insufficient evidence of identity.
W. G. Lightfoot.....	Mississippi.....	George Taylor.....	Washington, D. C.....	63	Allowed	Jan. 10, 1866	63	.....	Erroneously seized.
Elizabeth Lanier.....	South Carolina.....	A. C. Byaln.....	South Carolina.....	64	Rejected	Apr. 30, 1866	.....	.....	Sold to confederate government.
E. J. Lide.....				56	Allowed		56		Erroneously seized, subscribed to confederate loan.

COTTON CLAIMS.

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A. H. Lazare.....	New York.....	44		June 13, 1866		4, 085 40	Adjusted under purchasing regulations.
A. E. Lunsford.....	Missouri.....	20	Rejected	June 18, 1866	.....	10, 696 77	Labeled as confiscable; decree in favor of claimant.
W. G. Lightfoot.....	Macon, Ga.....	10	Allowed	Nov. 1, 1866	.....	1, 430 00	Erroneously seized.
A. H. Lazare.....	New York.....	1	do	Jan. 22, 1867	.....	25, 000 00	Adjusted under purchasing regulations.
John E. Livingston.....	Abbeville, S. C.....	7	Rejected	Oct. 19, 1867	.....	.....	Subscribed to confederate government.
Edward Maxwell et al.....	Louisiana.....	28	Allowed	Jan. 24, 1865	.....	7, 432 52	Erroneously seized as confederate property.
J. G. McBain.....	Tennessee.....	23	do	June 22, 1865	.....	3, 200 72	Do.
Mrs. E. Miller.....	Mississippi.....	72	do	Jan. 2, 1866	.....	8, 538 56	Do.
Lida Moore.....	do	59	Rejected	Jan. 10, 1866	.....	.....	Sold to confederate government.
E. W. Massey.....	Tennessee.....	19	do	Feb. 17, 1866	.....	.....	Military seizure.
John P. Moore.....	Louisiana.....	197	Allowed	Mar. 24, 1866	.....	25, 080 30	Erroneously collected under section 8, act of July 2, 1864.
John C. Melchor.....	Mississippi.....	2	do	Apr. 19, 1866	.....	574 43	Do.
Mrs. F. A. Moore.....	do	180	Rejected	May 16, 1866	.....	.....	Sold to confederate government.
J. McNab.....	Alabama.....	17	Allowed	June 14, 1866	.....	1, 845 25	Erroneously seized.
A. C. Mitchell.....	do	50	do	June 14, 1866	.....	5, 427 17	Do.
L. Merchant.....	Mississippi.....	4	do	Sept. 13, 1866	.....	640 79	Erroneously collected under section 8, act of July 2, 1864.
James McDaniel.....	Arkansas.....	98	Rejected	Oct. 31, 1866	.....	.....	Sold to confederate government.
W. S. Millar.....	Louisiana.....	17	Allowed	Nov. 9, 1866	.....	8, 064 84	Erroneously collected under section 8, act of July 2, 1864.
Maher & Wallace.....	South Carolina.....	68	do	Dec. 4, 1866	.....	2, 361 36	Erroneously seized.
R. Mure & Co.....	Texas.....	43	do	Dec. 10, 1866	68	.....	Seized as blockade cotton.
M. Malsch.....	do	49	do	Dec. 17, 1866	.....	7, 239 40	Erroneously seized.
John C. Murphy.....	Tennessee.....	40	Rejected	May 29, 1867	.....	.....	Insufficient evidence.
Memphis Bank of.....	Mississippi.....	15	do	Oct. 10, 1865	.....	.....	Subscribed to confederate loan.
Abra Navra.....	Tennessee.....	60	do	Oct. 10, 1865	.....	7, 732 64	Captured property.
S. E. Ogden.....	Louisiana.....	308	Rejected	Oct. 22, 1865	.....	.....	Erroneously collected under section 8, act of July 2, 1864.
Fergus Peniston.....	Mississippi.....	4	Allowed	Apr. 7, 1866	.....	7, 032 76	Property of confederate government.
Isaac I. Pollard.....	Alabama.....	25	do	Apr. 7, 1866	.....	539 88	Erroneously seized.
D. Pasell.....	do	17	do	Apr. 19, 1866	.....	3, 321 13	Do.
J. Powell.....	Mississippi.....	50	Allowed	May 8, 1866	50	3, 941 21	Erroneously collected under section 8, act of July 2, 1864.
Mrs. E. Pickett.....	Georgia.....	575	do	May 11, 1866	575	.....	Erroneously seized.
T. F. Person's estate.....	Pontiac & Co.....	32	Rejected	July 21, 1866	.....	2, 673 02	Brought in by military for owner.
W. A. Pickett.....	Louisiana.....	30	Allowed	Aug. 28, 1865	.....	12, 518 34	Claimant not the owner.
Peters & Maxwell.....	do	3	do	May 10, 1865	.....	379 06	Erroneously seized.
Charles Roberts.....	Louisiana.....	5	do	.....	.....	.....	Erroneously seized as abandoned.
William Riddle.....	.....	.....	.....	.....	.....	.....	.....

1227,248 pounds.

Paid on decree of court.

COTTON CLAIMS.

A.—List of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868—Continued.

Claimant.		Attorney.		No. of bales claimed.	Decision.	Date of decision.	Released.		Ground of decision, &c.
Name.	Residence.	Name.	Residence.				Bales.	Proceeds.	
George W. Ross.	Georgia.								
Rosenstock & Waller		T. H. Yeatman	Cincinnati, Ohio	44	Rejected Allowed.	Dec. 6, 1865 Dec. 14, 1865		\$1,790 93	Captured property. Erroneously collected under section 8, act of July 2, 1864.
Thomas P. Rubey	Mississippi								Do.
J. A. Roberts, administrator.		C. T. Sherman	Washington, D. C.	61	do Rejected	Dec. 14, 1865 Feb. 24, 1866		1,447 83	Sold to confederate agent.
Alice Roly et al.	do								
J. M. Ralford		Tucker & Sells	do	120	do	Apr. 12, 1866		10,854 33	Sold to confederate government.
Patrick Robinson	Alabama.	J. Gill Shorter	Washington, D. C.	100	Allowed.	June 14, 1866			Erroneously seized.
M. Rose.	Louisiana.	R. McAllister	do	10	do	Aug. 22, 1866		738 50	Do.
W. B. Suggs		S. V. Niles	do	15	Rejected	Sept. 22, 1866			Insufficient evidence.
				31	Allowed.	June 29, 1865			Erroneously seized as confederate property.
Thomas Sweeney	Mississippi								Erroneously seized.
W. F. Smith	Arkansas	R. Donnan	Vicksburgh, Miss.	2	do	July 6, 1865			Erroneously seized.
Mary E. Stout	Tennessee	S. V. Niles	Washington, D. C.	11 (*)	Rejected	Sept. 29, 1865 Oct. 24, 1865			Military seizure. No evidence of receipt by Treasury Department.
Samuel Snapp				57	Allowed.	Nov. 7, 1865	57		Seized for supposed violation of law.
Edward Scanlon	Georgia.								
W. F. Smith	Maryland	William Lilley	Washington, D. C.	1	Rejected Allowed	Feb. 19, 1866 Mar. 7, 1866		15,000 00	Captured property. Compensation for collecting cotton.
George Schley's estate.	Georgia								
F. Smith	New York	Robert Schley	Georgia.	246	Rejected Allowed	Mar. 29, 1866 Mar. 31, 1866		15,000 00	Captured property. Compensation for collecting cotton.
A. W. Sexton	Florida								
George P. Swift.	do	J. Gill Shorter	Alabama	15	do	Apr. 6, 1866		4,056 45	Erroneously seized.
W. M. Smith	South Ala.	Dean & McGinnis	New York	24	do	Apr. 7, 1866		4,571 12	Do.
Salomon Root & Co	New York			23	do	Apr. 12, 1866		2,631 00	Improperly seized. Seized as blockade; released on bond.
				128	do	Apr. 13, 1866	128		Erroneously collected under section 8, act of July 2, 1864.
Mrs. M. D. Shelby	Mississippi	J. W. Leftwich	Memphis, Tenn.	13	do	Apr. 19, 1866		4,530 74	Erroneously collected under section 8, act of July 2, 1864.
W. B. Stewart	do								
Paran Stevens et al	Alabama.	H. Hitchcock	New York	9	do	Apr. 19, 1866		683 93	Do.
J. M. Stark	do			60	do	May 2, 1866		10,432 20	Improperly seized.
G. P. Swift.	do	J. C. Cole	Alabama.	300	do	May 2, 1866		46,227 66	Do.
				53	Rejected	June 14, 1866			Confederate property.
Eliza H. Scott.	do			44	Allowed.	June 14, 1866		4,775 91	Erroneously seized.
W. M. Smith	do	J. Gill Shorter	Alabama.	200	Rejected	June 24, 1866			Confederate property.
John Smith	Scotia, Ala.	W. F. Randall	Washington, D. C.	22	Allowed.	July 31, 1866		573 30	Destroyed by military. Improperly seized.
Warren Shaw	Louisiana.	L. E. Parsons	Washington, D. C.	22	Rejected	Sept. 11, 1866			No evidence of receipt.
T. J. Scott		John Jolliffe	Washington, D. C.	123	Allowed.	Sept. 19, 1866		14,716 29	Erroneously seized as abandoned.
				1	do	Oct. 11, 1866		1,491 97	Erroneously collected under section 8, act of July 2, 1864.

COTTON CLAIMS.

H. Spanier	Louisiana	P. R. Skinner	53	do	Oct. 23, 1866	2,438 00	Erroneously seized.
F. Smith	New York	J. A. Logan	14	do	Oct. 23, 1866	2,500 00	Compensation for collecting.
Shepard, Parkman, Brooks & Co.	Alabama		11253	do	Dec. 11, 1866	157,444 66	Savage on captured cotton paid February 7, 1874.
W. A. Scott	do	J. Gill Shorter	25	Rejected	Jan. 4, 1867	761 24	Subscribed to confederate loan.
Do	do	do	5	Allowed	Jan. 4, 1867	.....	Erroneously seized.
William M. Smith	do	do	91	do	Mar. 7, 1867	64	Improperly seized.
R. J. Smith	South Carolina	Horatio King	91	Rejected	Feb. 26, 1866	.....	Insufficient evidence.
Warren Shaw	Louisiana	do	26	do	do	.....	Failure to identify.
O. O. Tiedlin	South Carolina	do	35	Allowed	June 20, 1865	35	Seized for supposed violation of law.
G. W. Turner and Clark, Wright & Co., ad- verses claimants.	Louisiana	do	165	(1)	Sept. 27, 1865	43,985 02	Erroneously seized as abandoned.
H. B. Tibbette	New York	J. Gill Shorter	8	Allowed	Feb. 15, 1866	.....	Erroneously seized.
W. H. Thornton	Alabama	C. J. M. Griffin	90	do	Apr. 7, 1866	2,668 89	Do.
W. F. Turner	Mississippi	J. W. Lettwith	438	do	Apr. 19, 1866	438	Do.
G. G. Torrey	do	do	53	do	do	14,099 40	Erroneously collected under sec- tion 8, act of July 2, 1864.
J. M. Trimble	Tennessee	R. Leach	90	do	May 3, 1866	7,728 99	Brought in by military for owner.
George H. Thompson	do	J. Gill Shorter	18	do	June 14, 1866	1,953 79	Erroneously seized.
M. T. Tye	Louisiana	Chipman & Hoemer	13	Rejected	Sept. 23, 1866	.....	Insufficient evidence.
John M. Tate, estate	Mississippi	A. Jeffries	282	do	Nov. 24, 1866	.....	Sold to confederate government.
A. E. Tracey & Co., as- signs of T. B. Trigg	Arkansas	do	45	Allowed	Dec. 14, 1866	2,016 49	Erroneously seized.
Silas Trow	Tennessee	Chipman & Hoemer	9	Rejected	May 27, 1867	.....	Captured property.
M. M. Vornack	Louisiana	do	15	Allowed	Feb. 25, 1865	3,858 03	Erroneously turned over.
J. M. Wiggin	Tennessee	do	4	do	Mar. 8, 1865	1,020 79	Erroneously seized as confederate property.
Wilson, Gibson & Co	do	do	455	do	Nov. 6, 1865	59,979 48	Adjusted under purchasing regu- lations.
B. F. Williamson	South Carolina	do	438	Rejected	Dec. 1, 1865	.....	Subscribed to the confederate loan.
S. H. Wills	do	A. C. Spain	100	do	Dec. 1, 1865	.....	Do.
John W. Williams	do	J. M. Campbell	50	do	Dec. 14, 1865	50	Improperly seized.
C. A. Weed & Co.	Louisiana	do	1,327	Allowed	Dec. 16, 1865	1,003	Adjusted under purchasing regu- lations.
John P. White	Tennessee	do	27	do	Dec. 18, 1865	27	Erroneously seized as confederate property.
B. D. Whitney	Washington, D. C.	do	1	do	Jan. 12, 1866	153 29	Erroneously collected under sec- tion 8, act of July 2, 1864.
Watts, Crane & Co	New York	W. P. Dale	264	do	Jan. 19, 1866	48,033 42	Erroneously seized.
D. C. Wilson	Mississippi	do	4	do	Apr. 27, 1866	1,326 00	Do.
South Carolina	do	W. W. Boyce	75	do	Apr. 27, 1866	6	Do.
Zero Walters	Alabama	J. Gill Shorter	16	Rejected	June 14, 1866	8,140 76	Do.
Woods & Gardner	do	do	69	Allowed	June 14, 1866	7,469 53	Subscribed to confederate govern- ment.
E. H. Wilson	do	do	.....	.....	.....	.....	Erroneously seized.

* 55,000 pounds.

† Proceeds turned over to supreme court, Cincinnati, Ohio.

A.—List of cotton claims presented to and adjudicated by the Secretary of the Treasury from January 1, 1865, to March 30, 1868—Continued.

Claimant.		Attorney.		No. of bales claimed.	Decision.	Date of decision.	Release.		Ground of decision, &c.
Name.	Residence.	Name.	Residence.				Bales.	Proceeds.	
Weaver & Hovey.....	Washington, D. C.	.....	.....	8	Allowed.	June 21, 1866	.....	\$975 95	Compensation for collecting.
Charles Whitlock.....	Virginia.....	.....	.....	15	do	July 10, 1866	.....	4,825 91	Erroneously seized.
John S. Williams, (as- signee of Joseph P. Billups, Mississippi.)	Illinois.....	John S. Williams.....	Illinois.....	220	do	July 31, 1866	.....	35,104 00	Erroneously seized as confederate property.
Wells, Brother & Co.....	Louisiana.....	C. E. Hovey.....	Washington, D. C.	8	do	Aug. 22, 1866	.....	857 02	Erroneously collected under sec- tion 8, act of July 2, 1864.
J. M. Walton.....	Alabama.....	J. Gill Shorter.....	Alabama.....	3	do	Sept. 15, 1866	.....	345 00	Erroneously seized.
Weaver & Hovey.....	Washington, D. C.	.....	.....	123	do	Oct. 29, 1866	.....	16,761 70	Compensation for collecting.
T. W. Watts.....	Louisiana.....	Brownell & Reinsch.....	.....	14	do	Nov. 3, 1866	.....	5,999 11	Erroneously collected under sec- tion 8, act of July 2, 1864.
W. W. Withenbury.....	do.....	E. McKee.....	Washington, D. C.	57	Rejected	Feb. 14, 1867	.....	.....	No evidence of receipt.
G. Whitfield.....	Alabama.....	J. Gill Shorter.....	Alabama.....	118	do	Sept. 27, 1867	.....	.....	Sold to confederate government.
Young, Woods & Gard- ner.	.....	.....	.....	5	Allowed.	Apr. 7, 1866	.....	671 24	Erroneously seized.
Total.....	.....	.....	.....	.....	.....	.....	.....	1,623,369 02	.....

B.—Statement of payments by the Treasury Department, under sundry acts of Congress, on account of claims arising from the seizure of cotton, from March 30, 1868, to June 30, 1876.

Claimant.		Attorney.		Date of act.	Number of bills.	Amount al- lowed.	Date of payment.
Name.	Residence.	Name.	Residence.				
Lander, Merchant & Co.	Mobile.			July 22, 1868	684	\$109,412 81	
Peter Rosecrants	Mobile.			July 22, 1868	241	39,253 10	
O. N. Cutler.	Missouri.			June 1, 1870	285	50,000 00	
T. F. McManus	Texas.			July 11, 1870	80	19,233 88	
Fannie M. Jackson	Tennessee.			May 21, 1872	12	1,400 00	
John J. Smith	Mississippi			June 10, 1872	7	906 27	
J. O. F. Burnside	Maryland.			Feb. 7, 1873	23	5,824 00	
J. P. Tyved.	Louisiana.		Ohio	June 23, 1874	...	8,320 43	
Susan A. Shelby	Mississippi	T. D. Lincoln		Jan. 19, 1875	100	10,351 02	
John Alfrede	Tennessee.			Mar. 3, 1875	240	97,129 37	June 19, 1872
Mason Manufacturing Company	Georgia.			July 27, 1868	340	7,785 08	November 2, 1874.
Alexander McLeod	South Carolina.	James Campbell	South Carolina.	July 27, 1868	38	12,138 60	
Total.						292,105 51	

COTTON CLAIMS.

Name of claimant.	Attorney of record.		Date of judgment.	Bales lowered.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Robert H. McCrooky.....	Hughes, Denver & Peck.	Washington, D. C.	June 25, 1867	15	Atlanta, Ga.	\$5,404 05	Aug. 31, 1867	
William Marham.....	do	do	June 25, 1867	10	do	3,693 70	Aug. 31, 1867	
John Silvey.....	do	do	June 25, 1867	39	do	14,650 53	Aug. 31, 1867	
John Deigan.....	D. N. Cooley	do	June 25, 1867	32	Charleston, S. C.	2,890 32	Sept. 28, 1867	
Margaret Bond.....	Lea & Cox	New York	June 25, 1867	15	Mobile, Ala.	2,743 22	Sept. 28, 1867	
Samuel G. Courtney.....	D. N. Cooley	Washington, D. C.	June 25, 1867	98	Charleston, S. C.	3,673 49	Sept. 30, 1867	
Joseph T. Giddings.....	do	do	June 25, 1867	130	do	18,236 02	Sept. 30, 1867	
Joachim Parsons.....	do	do	June 25, 1867	9	do	7,187 77	Sept. 30, 1867	
Joseph T. Coogan.....	Owen & Wilson	do	June 25, 1867	98	do	16,373 49	Sept. 30, 1867	
Patrick M. Adams.....	do	do	June 25, 1867	195	do	10,392 50	Sept. 30, 1867	
George I. Cunningham.....	Lea & Cox	New York	June 25, 1867	70	do	10,392 49	Oct. 1, 1867	
Celestine Belava.....	Hughes, Denver & Peck	Washington, D. C.	June 25, 1867	93	do	19,874 22	Oct. 2, 1867	
John W. Carmalt.....	Owen & Wilson	do	June 25, 1867	141	Mobile, Ala.	25,840 27	Oct. 2, 1867	
Thomas P. Enley.....	Black, Lamon & Co.	do	Jan. 13, 1868	48	Charleston, S. C.	8,539 83	Oct. 3, 1867	
Salina Wilkinson.....	do	do	Jan. 13, 1868	8	Washington County, Miss.	1,210 48	Jan. 21, 1868	
Henry G. Thomas.....	D. N. Cooley	do	Jan. 13, 1868	5	Charleston, S. C.	658 00	Jan. 21, 1868	
William T. Oliver.....	do	do	Jan. 13, 1868	1	do	131 20	Jan. 21, 1868	
Bartholomew Foley.....	do	do	Jan. 9, 1868	1	do	293 40	Jan. 21, 1868	
Benjamin Bell.....	Thomas Wilson	do	Jan. 13, 1868	203	do	28,846 48	Jan. 21, 1868	
John H. Grayer.....	D. N. Cooley	do	Jan. 27, 1868	89	do	4,549 48	Jan. 30, 1868	
Theodore Keester.....	do	do	Jan. 27, 1868	5	do	11,678 80	Feb. 3, 1868	
Helen Aubert.....	Hughes, Denver & Peck	do	Jan. 27, 1868	142	Mobile, Ala.	11,658 00	Feb. 4, 1868	
Max S. Meyer.....	do	do	Jan. 13, 1868	50	Savannah, Ga.	28,029 60	Feb. 10, 1868	
Edward Reynolds.....	D. N. Cooley	do	Mar. 23, 1868	30	Charleston, S. C.	11,771 19	Feb. 3, 1868	
Roderick Byrnes.....	do	do	Mar. 23, 1868	30	Charleston, S. C.	8,936 00	Apr. 3, 1868	
John H. Bruning.....	Cooley & Tobias	do	Mar. 23, 1868	61	do	8,498 94	Apr. 3, 1868	
Argelo Smith.....	D. N. Cooley	do	Mar. 23, 1868	15	do	1,968 00	Apr. 4, 1868	
Smith Howe.....	do	do	Mar. 23, 1868	3	do	393 60	Apr. 4, 1868	
Olivia S. Edmonds.....	do	do	Mar. 23, 1868	8	do	1,040 60	Apr. 8, 1868	
George Shrewsbury.....	do	do	Mar. 30, 1868	8	do	1,040 60	Apr. 8, 1868	
Knock T. Hancock.....	do	do	Mar. 30, 1868	28	do	3,673 60	Apr. 8, 1868	
Sarah Waite.....	do	do	Mar. 30, 1868	29	do	4,198 40	Apr. 8, 1868	
Thomas Aiken.....	do	do	Mar. 23, 1868	9	do	1,393 68	Apr. 8, 1868	
Rebecca Folen.....	do	do	Mar. 23, 1868	3	do	393 60	Apr. 8, 1868	
Ellas Garden.....	do	do	Mar. 23, 1868	53	do	6,953 60	Apr. 8, 1868	
Varina B. Galbier.....	George Taylor	do	Mar. 30, 1868	49	do	6,287 00	Apr. 9, 1868	
			Mar. 30, 1868	262	Concordia Parish, La.	84,422 98	Apr. 9, 1868	

Ernest Waltjen	A. L. & H. L. Merri-	do	Mar. 30, 1868	22	Charleston, S. C	2,886 40	Apr. 10, 1868
John McMahon	man.	do	Mar. 30, 1868	8	do	1,049 60	Apr. 10, 1868
Timothy Claffy	Cooley & Clark	do	Mar. 30, 1868	33	do	4,329 60	Apr. 10, 1868
Kateato of Thomas Igoo	D. N. Cooley	do	Mar. 30, 1868	54	do	7,084 80	Apr. 11, 1868
Charles D. Abrams	do	do	Apr. 6, 1868	14	do	1,826 80	Apr. 15, 1868
Eliza Hillborn	Thomas Wilson	do	Mar. 30, 1868	7	do	918 40	Apr. 15, 1868
Randolph L. Mott	Owen & Wilson	do	Mar. 30, 1868	640 1/2	do	114,146 04	Apr. 15, 1868
	Carlisle & McPherson.	do	Apr. 13, 1868		Savannah, Ga.		
Paul B. Barringer	Owen & Wilson	do	Apr. 6, 1868	106	Mississippi	32,573 80	Apr. 15, 1868
James B. McKeluse	Thomas Wilson	do	Mar. 30, 1868	21	Charleston, S. C	3,074 52	Apr. 15, 1868
Jacob Meyer	A. L. Merriman	do	Apr. 6, 1868	50	Savannah, Ga.	8,528 00	Apr. 17, 1868
John Lynch and James Lynch.	Hughes, Denver & Peck.	do	Apr. 13, 1868	108	Atlanta, Ga.	38,909 16	Apr. 20, 1868
Martha E. Street	do	do	Apr. 13, 1868	8	Charleston, S. C	1,901 12	Apr. 20, 1868
Levi C. Wells	do	do	Apr. 14, 1868	13	Atlanta, Ga.	4,683 51	Apr. 20, 1868
Finley Y. Clark	Cooley & Clark	do	Apr. 13, 1868	14	Savannah, Ga.	2,850 82	Apr. 21, 1868
Elias Brown and Morris Brown.	do	do	Apr. 13, 1868	52	do	9,181 12	Apr. 21, 1868
Simon Gerstmann	D. N. Cooley	do	Apr. 13, 1868	95	do	16,773 20	Apr. 21, 1868
Peter A. Fenuerty	George Taylor	do	May 4, 1868	1	Pine Bluff, Ark.	1,458 00	May 9, 1868
Thomas Cole	Owen & Wilson	do	May 4, 1868	2	Charleston, S. C	263 40	May 21, 1868
Joseph F. M. Derceff	do	do	May 14, 1868	2	do	263 40	May 21, 1868
John N. Mott	R. McAllister	do	June 8, 1868	53	Mobile, Ala.	9,716 49	June 15, 1868
George W. Turner	Walker, Stanton & Riddle.	do	June 8, 1868	80	Point Pleasant, La.	22,074 03	June 19, 1868
Lorenzo F. Potter	D. N. Cooley	do	June 15, 1868	23	Charleston, S. C	3,441 28	June 20, 1868
John A. Hudnall	do	do	Mar. 30, 1868	175	Brownsville, Tex.	43,958 60	June 24, 1868
James Armstrong	do	do	June 15, 1868	54	Charleston, S. C	6,688 44	July 3, 1868
James F. Carroll	Cooley & Clark	do	June 15, 1868	2	do	247 72	July 3, 1868
Henry West	do	do	June 15, 1868	2	do	217 72	July 3, 1868
James Rudolph	D. N. Cooley	do	June 15, 1868	4	do	495 44	July 3, 1868
T. Kenney and Kate Kenney.	do	do	June 15, 1868	2	do	354 16	July 3, 1868
John J. Fain	Hughes, Denver & Peck.	do	June 15, 1868	3	Atlanta, Ga.	1,077 00	Aug. 4, 1868
Moses Adler	Lewis & Cox	New York, N. Y.	June 8, 1868	73	Louisiana	13,333 09	Aug. 12, 1868
William M. Lowry	Hughes, Denver & Peck.	Washington, D. C	Mar. 29, 1869	47	Atlanta, Ga.	8,720 86	June 11, 1869
Julius A. Haydon	George Taylor	do	Apr. 24, 1869	187	do	50,581 60	June 11, 1869
Elisba Hunt	Hine & Wilson	do	Mar. 22, 1869	(*)	Chattanooga, Tenn.	8,720 00	June 14, 1869
John R. Holland	Carlisle & McPherson.	do	Apr. 26, 1869	(i)	Virginia	1,870 36	Sept. 20, 1869
Eldah L. Stanton, guardian.	George Taylor	do	May 24, 1868	194 1/2	"La Marque," La.	51,696 16	Mar. 11, 1870
Nelson Anderson	T. J. D. Fuller	do	Feb. 22, 1869	48	Charleston, S. C	6,550 16	Mar. 12, 1870
William Pollard	Stewart, Riddle & Leeki.	do	May 26, 1869	60	Savannah, Ga.	9,934 20	Mar. 25, 1870
Charles J. Quinby	Cooley & Peck	do	May 24, 1869	588	Charleston, S. C	67,015 02	Apr. 5, 1870
Philip Hayes	D. N. Cooley	do	May 26, 1869	14	do	1,685 92	Apr. 5, 1870

‡ And 36 barrels Turpentine.

† Woolen goods, cotton warp, &c.

* 16,000 Pounds.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales allowed.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
H. Henry Knoe	D. N. Cooley	Washington, D. C.	May 28, 1869	9	Charleston, S. C.	\$1,141 38	Apr. 5, 1870	
Edward Fordham	Owen & Wilson	New York, N. Y.	Feb. 28, 1869	12	do	1,521 84	Apr. 20, 1870	
Nathan Blun	Geopp, Stern & Norton.	do	Apr. 12, 1870	25	Savannah, Ga.	4,558 97	Apr. 23, 1870	
Calvin L. Gilbert	Stewart, Riddle & Leek.	Washington, D. C.	Apr. 20, 1870	24	do	3,973 68	Apr. 27, 1870	
Henry Wayne	Stewart, Riddle, Leek & Stanton.	do	Apr. 20, 1870	16	do	2,649 13	Apr. 27, 1870	
Delancy Jenks	do	do	Apr. 20, 1870	3	do	496 71	Apr. 27, 1870	
John Habersham	Stewart, Riddle & Leek.	do	Apr. 20, 1870	14	do	1,655 70	Apr. 27, 1870	
Morris Kohn	John A. Wills	do	Apr. 26, 1870	182	Floyd County, Ga.	109,771 90	Apr. 28, 1870	
Joseph Mintz and Simon Fess.	D. N. Cooley	do	May 10, 1869	14	Charleston, S. C.	1,395 02	May 2, 1870	
Charles R. Gelfuss	T. J. D. Fuller	do	Feb. 22, 1869	10	do	1,731 00	May 2, 1870	
John H. Fain	Hughes, Denver & Peck & Arnold.	Atlanta, Ga.	Feb. 22, 1869	58	Atlanta, Ga.	8,300 00	May 2, 1870	
Edward Padelford	Carlisle & McPherson	Washington, D. C.	Mar. 22, 1869	644	Savannah, Ga.	107,041 00	May 2, 1870	
C. B. Miller and J. B. Fellows.	do	do	May 23, 1869	100	Mobile, Ala.	17,333 00	June 4, 1870	
Henry Fields	Cooley & Clark	do	Mar. 14, 1870	5	Savannah, Ga.	887 85	June 22, 1870	
Joseph White	do	do	Mar. 14, 1870	11	do	1,881 97	June 22, 1870	
Leonard Wagner	do	do	Apr. 4, 1870	10	Charleston, S. C.	1,499 60	July 8, 1870	
Jacob Mills	do	do	Apr. 4, 1870	8	do	1,014 56	July 8, 1870	
John L. Fenwick	do	do	Apr. 4, 1870	8	do	533 65	July 8, 1870	
Mary McManus	do	do	Apr. 4, 1870	4	do	507 28	July 8, 1870	
H. W. Dorre and A. Seckendorf.	do	do	Apr. 4, 1870	4	do	887 74	July 8, 1870	
Tobias Scott	do	do	Apr. 4, 1870	2	do	253 64	July 8, 1870	
Henry Steltz	D. N. Cooley	do	Apr. 4, 1870	22	do	3,201 15	July 8, 1870	
James Heagney	Carlisle & McPherson	do	Apr. 11, 1870	14	Savannah, Ga.	2,317 98	July 19, 1870	
Joseph A. Saspontas	Cooley & Clark	do	Apr. 4, 1870	14	Charleston, S. C.	1,897 18	July 19, 1870	
John Thompson and William Robb.	do	do	Apr. 11, 1870	39	do	2,409 58	July 19, 1870	
Frederick Jaeger	Cooley & Wilson	do	Apr. 11, 1870	3	do	4,945 98	July 19, 1870	
David L. Mathews	Cooley & Clark	do	Apr. 11, 1870	1	do	196 82	July 19, 1870	
Christian Anne	do	do	Apr. 11, 1870	7	do	887 74	July 19, 1870	
William Grant	Cooley, Clark & Tobias.	do	Apr. 11, 1870	3	do	507 98	July 19, 1870	
William A. Cook	Cooley & Clark	do	Apr. 11, 1870	16	do	2,089 12	July 19, 1870	
Daniel McSwiney	do	do	Apr. 11, 1870	4	do	233 64	July 19, 1870	

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales lowered.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Warren M. Benton	Black, Lamson & Co.	Washington, D. C.	May 16, 1870	171	Lake Providence, La.	\$34,625 79	Oct. 13, 1870	
Henry A. Zaler	R. J. Atkinson	do	Mar. 22, 1869	115	do	19,681 92	Oct. 14, 1870	
Fredrick M. Schaffer	T. J. D. Fuller	do	May 24, 1869	14	Charleston, S. C.	1,570 73	Nov. 28, 1870	
B. Ogle Taylor's executors.	Carlisle & McPherson.	do	Apr. 25, 1870	73	Arcadia, Marengo County, Ala.	10,433 43	Dec. 1, 1870	
Horace B. Tobbetts	Hughes, Denver & Peck.	do	May 3, 1870	92	Carroll Parish, La.	19,225 24	Dec. 16, 1870	
Erastus S. Foster	Cooley & Clarke	do	May 3, 1870	71	Mobile, Ala.	12,305 72	Dec. 27, 1870	
Isaac Bernheimer, et al.	George Taylor	do	July 21, 1870	937	Savannah, Ga.	186,692 36	Jan. 3, 1871	
Charles Findley	G. C. Riddle	do	Jan. 16, 1871	Money.	Natchez, Miss.	2,767 16	Feb. 4, 1871	
Warren M. Benton	Black, Lamson & Co.	do	May 16, 1870	1	Lake Providence, La.	1,113 21	Mar. 4, 1871	
Louis Robler	Seward, Hughes, Seward & Peck.	New York and Washington, D. C.	Dec. 5, 1870	12	Savannah, Ga.	1,968 84	Apr. 12, 1871	
Hebrew Congregation.	do	do	Jan. 23, 1871	7	do	1,158 99	May 9, 1871	
Michael Lynch	Black, Lamson & Co.	Washington, D. C.	Feb. 13, 1871	30	Crawford Co., Ark.	8,109 22	May 15, 1871	
James O'Keefe	Cooley & Clarke	do	Dec. 6, 1869	18	Savannah, Ga.	1,655 70	May 17, 1871	
Thomas R. Mills et al.	Carlisle & McPherson.	do	Feb. 13, 1871	751	do	123,846 36	May 19, 1871	
James Kilduff	Carlisle, McPherson & Phillips.	do	June 2, 1870	153	Mobile, Ala.	25,229 70	May 19, 1871	
Fredrick Schuster	Seward, Hughes, Seward & Peck.	do	Feb. 20, 1871	272	Savannah, Ga.	45,334 84	May 25, 1871	
Diedrick Muller	T. J. D. Fuller	do	Feb. 20, 1871	28	Charleston, S. C.	4,197 08	May 27, 1871	
James G. Mills	Carlisle & McPherson.	do	Feb. 16, 1871	45	Savannah, Ga.	7,450 65	May 27, 1871	
Alfred Abrams	Owen & Wilson.	do	Feb. 13, 1871	1	Charleston, S. C.	196 82	May 29, 1871	
Alexander Stoddard	T. J. D. Fuller	do	Apr. 24, 1871	133	Mobile, Ala.	91,931 70	June 5, 1871	
Ferdinand Brown	Rice & Weed	Savannah, Ga., and Washington, D. C.	May 23, 1870	112	Savannah, Ga.	2,099 61	June 6, 1871	
Christian L. Blaise.	Cooley & Clarke	Washington, D. C.	Mar. 6, 1871	9	Charleston, S. C.	1,141 38	June 12, 1871	
Robert Cattel	Riddle & Munsey	do	Feb. 20, 1871	3	do	390 46	June 15, 1871	
George F. Drew	Cooley & Clarke	do	Mar. 13, 1871	200	Savannah, Ga.	33,114 00	June 20, 1871	
William D. Oliveira and Ellen M. Oliveira.	do	do	Mar. 13, 1871	4	do	668 28	June 20, 1871	
William G. Wiley and James G. Wiley.	Durant & McPherson.	do	Mar. 20, 1871	74	Carroll Parish, La.	90,134 10	June 22, 1871	
James McDonald	Seward, Hughes, Seward & Peck.	New York and Washington, D. C.	Mar. 13, 1871	4	Savannah, Ga.	698 28	June 23, 1871	
Richard Harrison	Cooley & Peck	Washington, D. C.	Mar. 20, 1871	6	Charleston, S. C.	700 92	June 24, 1871	
George N. Holmes	do	do	Mar. 20, 1871	2	do	253 64	June 24, 1871	
Henry Behrens	do	do	Mar. 20, 1871	4	do	207 28	June 24, 1871	

Reserved as internal-revenue tax.

COTTON CLAIMS.

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Daniel Sinclair	Wood & Clarke	do	Mar. 20, 1871	8	do	1,014 56	June 24, 1871
Lazarus Strause	DeZug, Stanton & Peck	do	Mar. 20, 1871	33	Savannah, Ga.	5,463 81	June 26, 1871
Lewis Fried	Seward, Hughes, Denver & Peck	New York and Washington, D.C.	Mar. 27, 1871	31	do	5,192 63	July 6, 1871
William Duggan	Hughes, Denver & Peck	Washington, D.C.	Mar. 20, 1871	1	do	165 57	July 6, 1871
Thomasine B. Hoyt and James M. Attie	do	do	Mar. 27, 1871	12	Baldwin, Fla.	7,987 79	July 6, 1871
Henry Wilburz and Simon Wilkowski	Seward, Hughes, Denver & Peck	New York and Washington, D.C.	Apr. 10, 1870	343	Savannah, Ga.	54,700 51	July 12, 1871
Michael Gordon	Hughes, Denver & Peck	Washington, D.C.	Mar. 20, 1871	6	do	993 42	July 12, 1871
Francis J. Ruohk	Chipman & Hoamer	do	Apr. 10, 1871	4	Charleston, S.C.	692 40	July 18, 1871
Jacob Cohen	McCarthy, Rice & Morrison	Savannah, Ga. and Washington, D.C.	Apr. 17, 1871	16	Savannah, Ga.	2,649 12	July 18, 1871
William T. Porter	Owen & Wilson	Washington, D.C.	Apr. 24, 1871	30	Charleston, S.C.	3,955 46	July 27, 1871
Patrick Kennedy	Cooley & Clarke	do	Apr. 24, 1871	(1)	do	465 13	July 29, 1871
Charles and Margaret Schmitt	Cooley & Clarke	Washington, D.C.	Apr. 24, 1871	5	Charleston, S.C.	684 70	July 29, 1871
Joanna Milton	T. J. D. Fuller	do	May 1, 1871	17	Mobile, Ala.	2,803 30	Aug. 2, 1871
Turcose Nugent, jr.	Seward, Hughes, Denver & Peck	New York and Washington, D.C.	Mar. 20, 1871	12	Savannah, Ga.	2,166 72	Aug. 2, 1871
Charlotte M. E. Gallie	do	do	Apr. 24, 1871	116	do	19,206 12	Aug. 2, 1871
James A. Seldon	Ewing, Heller & Wilson	Washington, D.C.	Apr. 24, 1871	176	Tenness Parish, La.	43,093 50	Aug. 2, 1871
Lewis Ross	Stewart, Riddle & Leaki	do	Apr. 24, 1871	(1)	Savannah, Ga.	1,178 59	Aug. 8, 1871
Michael Boely	Stewart, Riddle & Leaki and Stanton	do	May 1, 1871	7	do	1,159 99	Aug. 8, 1871
Samuel Worthington's	Barley, Stanton, Carlsle & McPherson	do	Mar. 13, 1871	814	Washington County, Miss.	157,342 13	Aug. 14, 1871
Philip Delanyaki and Davis Greenfield	Seward, Hughes, Denver & Peck	New York and Washington, D.C.	Feb. 7, 1871	199	Savannah, Ga.	34,207 59	Aug. 16, 1871
Elina and Morris Brown	Cooley & Clarke	Washington, D.C.	Apr. 13, 1868	do	do	723 32	Aug. 25, 1871
Simon Germain	D. N. Cooley	do	Apr. 13, 1868	do	do	1,321 45	Aug. 25, 1871
Hein Aubert	Hughes, Denver & Peck	do	Jan. 20, 1868	do	Mobile, Ala.	686 90	Aug. 25, 1871
Finley Y. Clark	Cooley & Clarke	do	Apr. 13, 1868	do	Savannah, Ga.	496 51	Aug. 25, 1871
Jacob Mayer	A. L. Merriman	do	Apr. 6, 1868	do	do	695 50	Aug. 25, 1871
Max S. Mayer	Hughes, Denver & Peck	do	Jan. 13, 1868	do	do	645 36	Aug. 25, 1871
Randolph Mott	Carlsle & McPherson	do	Apr. 13, 1868	do	do	8,992 81	Aug. 25, 1871
Tonia de Reban	Hine & Wilson	do	May 22, 1871	151	Wilmington, N.C.	15,633 75	Aug. 26, 1871
William J. Myers, Son & Co.	Seward, Hughes, Denver & Peck	New York and Washington, D.C.	May 22, 1871	302	Savannah, Ga.	50,008 14	Aug. 26, 1871
John W. Carmalt	Owen & Wilson	Washington, D.C.	June 25, 1867	do	Charleston, S.C.	218 79	Aug. 29, 1871
Patrick J. Coogan	do	do	June 25, 1867	do	do	430 50	Aug. 29, 1871

: 2,000 pounds.

1 Turpentine, 131 barrels.

* And 110 pounds.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Sales allowed.	Where captured.	Amount paid.	Date of payment.	Reserved as internal-revenue tax.
	Name.	Residence.						
Margaret Bond	Lewis & Cox	New York	June 25, 1867		Mobile, Ala.	\$73 83	Aug. 20, 1871	Do.
George I. Cunningham	do	do	June 25, 1867		Charleston, S. C.	312 85	Aug. 20, 1871	Do.
John Delger	D. N. Cooley	Washington, D. C.	June 25, 1867		do	74 00	Aug. 20, 1871	Do.
Joseph Mortens	do	do	June 25, 1867		do	04 19	Aug. 20, 1871	Do.
Patrick Moran	Owen & Wilson	do	June 25, 1867		do	265 75	Aug. 20, 1871	Do.
Celstine Esalava	Hughes, Denver & Peck	do	June 25, 1867		Mobile, Ala.	603 98	Aug. 20, 1871	Do.
Joseph Purcell	D. N. Cooley	do	June 25, 1867		Charleston, S. C.	467 59	Aug. 20, 1871	Do.
Samuel G. Courtney	do	do	June 25, 1867		do	04 19	Aug. 20, 1871	Do.
Daniel Haas	Cooley & Clarke	do	May 22, 1871	90	Charleston Neck, S. C.	11,413 80	Aug. 20, 1871	Do.
Mary Ann Cherrill	do	do	May 26, 1871	8	Charleston, S. C.	1,014 56	Aug. 30, 1871	Do.
James S. Rhodes, administrator.	do	do	May 26, 1871	(*)	Rikersville, S. C.	5,371 53	Aug. 30, 1871	Do.
James Mix	Hughes, Denver & Peck	do	May 26, 1871	94	Grand Junction, Tenn.	5,318 57	Sept. 1, 1871	Do.
Alexander and Hugh C. Lecky.	Carlisle & McPherson.	do	May 6, 1871	90	Leighton, Ala.	2,923 00	Sept. 1, 1871	Do.
Francis T. Willis.	do	do	May 26, 1871	134	Savannah, Ga.	22,186 38	Sept. 12, 1871	Do.
Andrew M. Ross, administrator.	do	do	Apr. 25, 1870	40	do	9,091 90	Sept. 15, 1871	Do.
William J. Minor's executrix.	T. H. N. McPherson	do	May 26, 1871	(†)	Terrebonne Parish, La.	20,481 71	Sept. 20, 1871	Do.
Richard Kelly, administrator.	Blair & Dick	do	Apr. 24, 1871	6	Charleston, S. C.	700 92	Sept. 27, 1871	Do.
Maximilian A. Dauphin	Hughes, Denver & Peck.	do	Nov. 20, 1870	95	Mobile, Ala.	15,605 75	Oct. 3, 1871	Do.
Lonis F. Krester	D. N. Cooley	do	Apr. 25, 1870	123	Charleston, S. C.	15,103 60	Oct. 3, 1871	Do.
Frederick Chastanet	Riddle & Miller	do	May 1, 1871	15	Savannah, Ga.	2,843 31	Oct. 3, 1871	Do.
Henry Schaber	Cooley & Clarke	do	Apr. 11, 1870	53	do	7,450 65	Oct. 23, 1871	Do.
Max Levy	do	do	May 26, 1871	(‡)	Charleston, S. C.	4,863 63	Nov. 6, 1871	Do.
Benjamin Mantone	do	do	May 8, 1871	57	do	9,498 48	Nov. 6, 1871	Do.
Azariah Mims	Hughes, Denver & Peck.	do	Mar. 16, 1869	2	Atlanta, Ga.	719 89	Nov. 14, 1871	Do.
David and Thomas Harrison.	Seward, Hughes, Denver & Peck.	New York and Washington, D. C.	May 15, 1871	309	Savannah, Ga.	51,101 13	Nov. 24, 1871	Do.
George Taylor and William Tipper.	do	do	Apr. 10, 1871	50	do	8,978 50	Nov. 24, 1871	Do.
Stephen Watson	do	do	May 15, 1871	4.0	do	60,539 40	Nov. 24, 1871	Do.
Sheldon W. Wight	A. S. Dineen	New York	Apr. 25, 1870	40	do	6,022 80	Dec. 5, 1871	Do.
Edward Laplante	Hughes, Denver & Peck.	Washington, D. C.	Mar. 27, 1871	27.5	Atlanta, Ga.	112,450 25	Feb. 2, 1872	Do.

Victor F. Wilson's administrator.	Bartley & Lincoln ..	Cincinnati, Ohio ..	May 26, 1869	560	Vicksburgh, Miss.	125,300 00	Feb. 14, 1872
Ralph McElrath.	Cooley & Clarke ..	Washington, D. C.	Apr. 4, 1870	511	Savannah, Ga.	7,323 99	Mar. 11, 1872
Thomas G. W. Cruseell.	Hughes, Denver & Peck.	do ..	Mar. 1, 1869	75	Atlanta, Ga.	26,275 62	Apr. 4, 1872
John Silvey	do ..	do ..	Mar. 22, 1869	71	do ..	27,715 38	Apr. 4, 1872
Jean Sauvatre	George Taylor ..	do ..	Jan. 15, 1872	5	Savannah, Ga.	1,127 65	Apr. 24, 1872
Delway B. W.alkington	H. Barnard ..	New York ..	Jan. 22, 1872	98	Mobile, Ala.	16,160 20	Apr. 26, 1872
Catharine Peterson, administrator.	Cooley & Clarke ..	Washington, D. C.	Jan. 15, 1872	3	Charleston, S. C.	366 21	May 6, 1872
Oliver H. Long, guardian of Lita Moore.	George Taylor ..	do ..	Feb. 5, 1872	57	Newton County, Miss.	6,640 50	May 16, 1872
Ramon Molins.	Seward, Hughes, Denver & Peck.	New York and Washington, D. C.	Feb. 20, 1871	24	Savannah, Ga.	3,973 68	May 21, 1872
David Bush's executrix	T. H. N. McPherson.	Washington, D. C.	Feb. 19, 1872	80	Louisiana ..	11,903 90	May 23, 1872
John V. Sevier	do ..	do ..	Feb. 18, 1872	27	do ..	5,181 48	May 23, 1872
Gustave A. Wirth	Hughes, Denver & Peck.	do ..	Feb. 5, 1872	24	Mobile, Ala.	3,957 60	May 27, 1872
Joseph Block	Chase, Hartley & Coleman ..	do ..	Mar. 11, 1872	119	Louisiana ..	22,848 00	June 13, 1872
John F. Hamilton	Seward, Hughes & Denver & Peck.	New York and Washington, D. C.	Mar. 11, 1872	91	Savannah, Ga.	15,426 63	June 14, 1872
Harry Hayn	do ..	do ..	Mar. 11, 1872	360	do ..	69,077 46	June 14, 1872
James Foley	do ..	do ..	Mar. 11, 1872	8	do ..	1,354 56	June 14, 1872
Edmund L. Martin	Black, Lemon & Co.	Washington, D. C.	Mar. 11, 1872	32	Saint Landry Parish, La.	7,338 40	June 14, 1872
William Hunt	Cooley & Clarke ..	do ..	Mar. 11, 1872	38	Charleston, S. C.	4,638 66	June 18, 1872
Wolfe Burnett	do ..	do ..	Mar. 11, 1872	22	Savannah, Ga.	4,949 14	June 18, 1872
James Wilde, Jr.	do ..	do ..	Mar. 11, 1872	92	Savannah, Ga.	4,863 93	June 18, 1872
James H. Johnson	do ..	do ..	Mar. 11, 1872	157	South Carolina ..	19,473 13	June 18, 1872
George W. Carroll's administrator.	R. M. Corwine ..	do ..	May 2, 1872	347	Charleston, S. C.	53,353 63	June 20, 1872
Donald O. Grady's executor, John Quinlan & Co.	Fuller & Chapman ..	do ..	Apr. 1, 1872	414	Ark.	68,268 00	July 2, 1872
Asner Ayres.	Hughes, Denver & Peck.	do ..	Apr. 1, 1872	209	Mobile, Ala.	34,604 08	July 3, 1872
William W. Worthington	Bartley, Stanton, Carlick & McPherson.	do ..	Apr. 1, 1872	222	Savannah, Ga.	42,904 83	July 6, 1872
Daniel Ferguson	Hughes, Denver & Peck.	do ..	Apr. 1, 1872	46	Miss. County, Miss.	15,343 88	July 8, 1872
Malvin B. Wilbur	Cooley & Clarke ..	do ..	Apr. 1, 1872	9	Charleston, S. C.	1,098 63	July 10, 1872
Eida F. Torck	do ..	do ..	Apr. 1, 1872	7	do ..	1,278 91	July 10, 1872
William McIntyre and Robert McIntyre	do ..	do ..	Apr. 1, 1872	27	Savannah, Ga.	4,830 15	July 10, 1872
Simon Quagranze's administrator.	do ..	do ..	Apr. 1, 1872	76	Saint Landry Parish, La.	14,599 00	July 10, 1872
William H. Greene.	D. N. Cooley ..	do ..	Apr. 2, 1872	47	Charleston, S. C.	10,549 15	July 10, 1872
James Cantwell.	do ..	do ..	Apr. 8, 1872	83	do ..	10,131 81	July 11, 1872

§ And 24 bags.

; 609 barrels rosin.

* 738 barrels rosin.

† Sugar and molasses.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales allowed.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
George W. Anderson...	Seward, Hughes, Denver & Peck.	New York and Washington.	Apr. 8, 1872	26	Savannah, Ga.	\$5,863 78	July 11, 1872	
Alexander Abrams...	do	do	Apr. 8, 1872	9	do	1,490 13	July 11, 1872	
William Hunter...	do	do	Apr. 8, 1872	20	do	3,311 40	July 11, 1872	
Theodore B. Marshall and Geo. S. Marshall.	do	do	Apr. 8, 1872	84	do	13,907 88	July 11, 1872	
Levi De Witt and Richard Morgan.	do	do	Apr. 8, 1872	61	do	11,358 93	July 11, 1872	
Daniel H. Ballwin.	do	do	Apr. 8, 1872	74	do	12,232 18	July 11, 1872	
James K. Kelly.	do	do	Apr. 8, 1872	60	do	9,924 80	July 11, 1872	
William Lightfoot and David Flanders.	do	do	Apr. 8, 1872	15	do	2,483 55	July 11, 1872	
Henry C. Freeman's administrator.	Stewart, Riddle & Leek.	Washington, D. C.	Apr. 8, 1872	81	do	13,411 17	July 17, 1872	
Esadore Collin.	Seward, Hughes, Denver & Peck.	New York and Washington, D. C.	Apr. 15, 1872	333	do	55,134 81	July 19, 1872	
James W. Lathrop and Harvey W. Lathrop.	Seward, Hughes, Denver & Peck.	Washington, D. C.	Apr. 15, 1872	35	Brownsville, Tex.	5,775 00	July 19, 1872	
Samuel F. O'Neill.	do	do	Apr. 15, 1872	39	Savannah, Ga.	8,795 87	July 19, 1872	
John Stevenson.	do	do	Apr. 15, 1872	18	do	2,980 36	July 19, 1872	
E. E. Simpson et al., administrators of John A. Simpson.	do	Washington, D. C.	Apr. 15, 1872	11	do	1,821 27	July 19, 1872	
Esauel E. Simpson.	Chase, Hartley & Coleman.	do	Apr. 15, 1872	(1)	do	28,380 13	July 19, 1872	
Erastus Henry.	Cooty & Clarke.	do	Apr. 15, 1872	26	Savannah, Ga.	5,504 02	July 20, 1872	
John C. Soureiner & Son.	W. S. Decong and Stanton.	do	Apr. 15, 1872	43	do	7,119 51	July 22, 1872	
Herman Parker's administrator.	Cooty & Clarke.	do	Apr. 22, 1872	32	Mobile, Ala.	5,276 80	July 23, 1872	
Eli Côté, for use of J. C. Martin et al.	Mann & Parsons.	New York	Apr. 15, 1872	75	Charleston, S. C.	9,871 91	July 24, 1872	
Desiré Godot.	Carillo & McPherson.	Washington, D. C.	Apr. 17, 1872	30	Saint Landry Parish, La.	5,760 00	July 26, 1872	
Lawrence de Givo.	Cooty & Clarke.	do	Apr. 22, 1872	10	Savannah, Ga.	2,955 30	July 27, 1872	
Andrew Low.	Hughes, Denver & Peck.	do	Apr. 22, 1872	2,595	do	450,560 19	Aug. 1, 1872	
Henry A. Helmmond's administrator and Samuel Willmot.	Seward, Hughes, Denver & Peck.	New York and Washington.	Apr. 22, 1872	82	do	16,093 46	Aug. 1, 1872	

Edward Padelford's ex- ecutors	Carliato & McPherson	Washington, D. C.	Apr. 15, 1872	69	do	12, 323 73	Aug. 1, 1872
Chandler H. Smith	do	do	Apr. 15, 1872	159	do	25, 166 64	Aug. 1, 1872
Albert Johnson & Co. for use of Mar- tin Tully	Chipman & Hoemer	do	Apr. 8, 1872	9	Panola County, Tex.	421 90	Aug. 1, 1872
Adolph B. Wesley	Cooley & Clarke	do	Apr. 22, 1872	33	Savannah, Ga.	5, 463 81	Aug. 1, 1872
Adrian Fernandez	do	do	Apr. 23, 1872	118	do	19, 537 26	Aug. 5, 1872
Edwin Parsons and George Parsons, ad- mins.	Carliato & McPherson	do	Apr. 23, 1872	104	do	17, 219 23	Aug. 7, 1872
Edward Padelford's ex- ecutors	do	do	Apr. 29, 1872	206	do	25, 585 35	Aug. 7, 1872
Edw. J. et al.	do	do	Apr. 29, 1872	95	St. Landry Parish, La.	18, 240 00	Aug. 7, 1872
Michel Castille	Cooley & Clarke	do	Apr. 29, 1872	630	Carroll Parish, La.	92, 547 00	Aug. 8, 1872
Jullius Witkowski	Peck & Hovey	do	May 6, 1872	143	Cass, Gordon, and Floyd Counties, Ga.	63, 712 83	Aug. 10, 1872
Edwin M. Price	Owen & Wilson	do	May 8, 1872	118	Savannah, Ga.	21, 396 02	Aug. 12, 1872
William B. Adams	Seward, Hughes & Peck	New York and Washington, D. C.	May 8, 1872	289	do	42, 652 37	Aug. 12, 1872
Abraham Becher	do	do	May 8, 1872	97	do	4, 470 39	Aug. 12, 1872
Luke Christie	do	do	May 8, 1872	84	do	15, 237 00	Aug. 12, 1872
John R. Wilder	do	do	May 8, 1872	291	do	5, 298 43	Aug. 12, 1872
Levell & Lattimore	do	do	May 8, 1872	4	do	663 28	Aug. 12, 1872
William Lattimore	do	do	May 8, 1872	345	do	6, 439 20	Aug. 12, 1872
Edward Lovell	do	do	May 8, 1872	102	do	16, 888 14	Aug. 12, 1872
Arnon Wilbur's, ex'r.	do	do	May 8, 1872	58	Atlanta, Ga.	12, 385 88	Aug. 12, 1872
Alfred Austell	Hughes, Denver & Peck	Washington, D. C.	May 8, 1872	70	Wilmington, N. C.	7, 000 00	Aug. 12, 1872
Alexander Oldham	Hine & Wilson	do	May 8, 1872	43	Charleston, S. C.	8, 213 03	Aug. 12, 1872
Herman Bulwinkle	Thomas Wilson	do	May 6, 1872	45	Savannah, Ga.	10, 148 85	Aug. 13, 1872
Henry Meinhard and Isaac Meinhard	Stewart, Riddle & Leski	do	May 6, 1872	118	do	19, 537 26	Aug. 13, 1872
Simon Witkowski	do	do	May 13, 1872	9	do	1, 729 97	Aug. 14, 1872
William Lindon	Seward, Hughes & Denver & Peck	New York and Washington, D. C.	May 13, 1872	154	do	2, 566 33	Aug. 17, 1872
Ralph Meldrum	Cooley & Clarke	Washington, D. C.	May 6, 1872	363	do	67, 258 23	Feb. 17, 1873
John S. Daniel's ad- ministratrix	Seward, Hughes & Denver & Peck	New York and Washington, D. C.	Nov. 18, 1872	89	Conway Co., Ark.	16, 730 00	Feb. 19, 1873
Hibernia Armstrong	R. M. Corwine	Washington, D. C.	May 8, 1872	65	Marshall Co., Tenn.	43, 232 00	Apr. 26, 1873
Hugh Carliato and Geo. S. Henderson	Carliato & McPherson	do	Apr. 21, 1873	1462	Coahoma Co., Miss.	32, 460 39	May 14, 1873
James C. Terry, sur- vivor of Terry and Carnes	Atkinson & Lincoln	do	Feb. 10, 1873	611	Savannah, Ga.	107, 136 63	May 15, 1873
Henry Coble's ex'r	Seward, Hughes & Denver & Peck	New York and Washington, D. C.	Feb. 10, 1873	57	do	10, 784 75	May 15, 1873
Octavius Cohen	do	do	Feb. 10, 1873	107	do	24, 130 47	May 21, 1873
Sam'l Meinhard, Isaac M. Frank, and Abra- ham Epstein	Stewart, Riddle & Leski	Washington, D. C.	Feb. 17, 1873		do		

* Proceeds of Louisiana Bank notes.

† Deposit in Bank of Louisiana.

Judgment on mandate of Su-
preme Court.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Balances allowed, &c.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Ako Henry	Fuller, Hine & Wilson.	Washington, D. C.	May 26, 1871	97	Dalton, Ga.	\$12,345 75	May 24, 1873	
William Markham	Hughes, Denver & Peck.	do	Feb. 24, 1873	15	—, Fla.	5,891 99	May 29, 1873	
Isaac Rosenholm	Stewart, Riddle & Leek.	do	Feb. 24, 1873	81	Savannah, Ga.	14,201 73	June 2, 1873	
Antonie Cairo, for use of Thomas C. Payan.	Chase, Hartley & Coleman.	do	Mar. 3, 1873	188	Louisiana	36,066 00	June 2, 1873	
Virginia Sheftall	Swart, Hughes, Denver & Peck.	New York and Washington, D. C.	Mar. 3, 1873	18	Savannah, Ga.	4,172 22	June 6, 1873	
John S. Rogers	do	do	Mar. 3, 1873	45	do	7,880 85	June 6, 1873	
John A. Douglass	do	do	Mar. 3, 1873	35	do	6,136 55	June 6, 1873	
John M. Cooper	do	do	Mar. 3, 1873	32	do	6,570 38	June 6, 1873	
William H. Hunter and John Gammell.	do	do	Mar. 3, 1873	20	do	3,506 60	June 6, 1873	
William W. Gordon and Nelly K. Gordon.	do	do	Mar. 3, 1873	13	do	3,013 27	June 6, 1873	
John Richards and Margaret Richards.	do	do	Mar. 3, 1873	81	do	1,970 21	June 6, 1873	
Henry D. Headman	do	do	Mar. 3, 1873	3	do	695 37	June 6, 1873	
William H. Starke	Cooley & Clark	Washington, D. C.	Mar. 3, 1873	227	do	44,938 77	June 6, 1873	
Jacob Stern	do	do	Mar. 3, 1873	6	do	1,300 74	June 6, 1873	
Karl M. Oppenheimer	do	do	Mar. 3, 1873	19	do	3,793 95	June 6, 1873	
Stern & Oppenheimer	do	do	Mar. 3, 1873	28	do	4,909 24	June 6, 1873	
Edwin Bates	D. N. Cooley	do	Mar. 3, 1873	82	Charleston, S. C.	10,627 06	June 6, 1873	
Ivoratio N. Spencer	George Taylor	do	Mar. 3, 1873	53	Carroll Parish, La.	4,545 81	June 11, 1873	
Robert Hunter	J. Daniels & George Taylor.	do	Mar. 3, 1873	14	Charleston, S. C.	1,824 62	June 11, 1873	
Rufus C. Barkley	J. Daniels	do	Mar. 3, 1873	23	do	5,327 03	June 11, 1873	
Charles Deignan	Daniels & Taylor	do	Mar. 3, 1873	7	do	912 31	June 11, 1873	
Stephen S. Boone	Taylor & McGuire	do	Mar. 3, 1873	11	Savannah, Ga.	1,924 63	June 11, 1873	
Aaron Champion	Cooley & Clark	do	Mar. 3, 1873	40	do	7,013 20	June 12, 1873	
George H. Linetall	do	do	Feb. 24, 1873	16	Charleston, S. C.	2,085 28	June 12, 1873	
Lowell T. Whitcomb	do	do	Mar. 3, 1873	11	Savannah, Ga.	2,549 69	June 12, 1873	
James Reed, for use of Bonni O. Carpenter.	Glassey, Weed & Clark.	do	Mar. 3, 1873	48	do	8,415 84	June 12, 1873	
John J. Gardner	Chase, Hartley & Coleman.	do	Mar. 24, 1873	49	St. Landry Parish, La.	9,408 00	June 23, 1873	
Zetton J. Broussard	do	do	Mar. 24, 1873	52	Louisiana	15,744 00	June 23, 1873	
Julius Perroldin	McPherson & Durand.	do	Mar. 24, 1873	330	St. Landry Parish, La.	64,519 00	June 24, 1873	
David W. Davis	Daniels & Taylor	do	Mar. 24, 1873	5	Charleston, S. C.	151 05	June 27, 1873	
Augustus W. Eckel	do	do	Mar. 24, 1873	6	do	781 96	June 27, 1873	

George J. Huthmacher	J. Daniels	do	Mar. 24, 1873	11	do	1,433 63	June 27, 1873
Cornelius Donato	Cooley & Clark	do	Mar. 24, 1873	15	St. Landry Parish, La	960 00	June 28, 1873
James Snipes	do	do	Mar. 24, 1873	32	Charleston, S. C.	65 16	June 28, 1873
Thaddeus Kelly's adm'r	do	do	Mar. 24, 1873	32	do	5,170 56	June 28, 1873
Abraham H. Matthews	Black, Lamson & Co	do	Mar. 31, 1873	92	Savannah, Ga.	16,130 36	July 2, 1873
Michael Slattery	Barley & Casey	do	Mar. 31, 1873	1	Vicksburg, Miss	320 55	July 3, 1873
James Hunter's executor	Hughes, Denver & Peck	do	Mar. 31, 1873	Iron	Richmond, Va.	4,375 00	July 3, 1873
John M. Powell	Barley & Casey	do	Feb. 10, 1873	92-100	Coahoma Co., Miss.	1,994 77	July 8, 1873
Thomas W. Keay's administrators	Greenfield, Owen & Wilson	do	Mar. 31, 1873	9	Charleston, S. C.	1,172 97	July 9, 1873
Thomas McDermott and Catharine McDermott	Seward, Hughes, Denver & Peck	do	May 19, 1873	3	Savannah, Ga.	525 90	July 17, 1873
Emma P. Sykes	Hughes, Denver & Peck	do	Apr. 21, 1873	44	Noxubee County, Miss.	3,352 36	July 24, 1873
William W. Cones	do	do	May 26, 1873	252	Miss., Tenn., La., and Ala.	92,598 40	Aug. 26, 1873
Eliza Hans Chaplin's executor	Owen & Wilson	do	June 2, 1873	581	South Carolina	9,432 12	Sept. 3, 1873
Martin Tally	Black, Lamson & Co	do	June 2, 1873	8	New Orleans, La.	678 72	Sept. 3, 1873
William M. Wilson	Chipman & Hoemer	do	May 19, 1873	55	Mobile, Ala.	9,625 00	Sept. 3, 1873
Eliza Hardesty's executor	do	do	June 2, 1873	Money	New Orleans, La.	27,339 56	Sept. 4, 1873
Matilda Johnson	R. M. Corwine	Cincinnati, Ohio	June 2, 1873	32	Pulaski County, Ark	15,195 52	Sept. 4, 1873
Howell W. Wright	T. J. D. Fuller	Washington, D. C.	June 2, 1873	Cotton-sacks	Augusta, Ga.	1,820 10	Sept. 5, 1873
John F. Pargoud	T. S. Durant	do	June 2, 1873	81	Louisiana	15,206 81	Sept. 6, 1873
J. Wesley Vick	Barley & Casey	do	June 4, 1873	25	Warren Co., Miss	7,665 75	Sept. 6, 1873
R. A. Rutherford and N. S. Rector	do	do	June 4, 1873	17	Mississippi	1,356 10	Sept. 6, 1873
Freeman Burr	T. J. Durant	do	June 4, 1873	27	Texas	4,109 40	Sept. 6, 1873
Warren R. Dent	George Taylor	do	June 2, 1873	33	Opelousa, La.	6,736 00	Sept. 6, 1873
Sauuel Houston	do	do	June 2, 1873	100	Jefferson Co., Miss.	17,923 90	Sept. 6, 1873
Lucy C. Murphy	do	do	June 2, 1873	21	Arkansas	2,253 47	Sept. 6, 1873
William J. Pollovent	do	do	June 2, 1873	34	Louisiana	6,728 00	Sept. 6, 1873
Mathew Malach	do	do	May 26, 1873	10	do	1,651 27	Sept. 6, 1873
Brittain M. Odum	Thomas Wilson	do	June 4, 1873	54	Texas	8,218 80	Sept. 10, 1873
James Sheppard	do	do	June 4, 1873	42	do	4,392 40	Sept. 10, 1873
Daniel O'Conner, for use of J. B. Stewart	George Taylor	do	June 2, 1873	122	Arkansas	28,251 84	Sept. 10, 1873
Leon Lippman, survivor of L. and M. Lippman	J. J. Weed	do	June 2, 1873	10	Savannah, Ga.	2,317 90	Sept. 10, 1873
Henry Brigham et al.	Hughes, Denver & Peck	do	June 2, 1873	23	Mobile	4,025 00	Sept. 10, 1873
James N. Cartwright	Seward, Hughes, Denver & Peck	New York and Washington, D. C.	June 2, 1873	5	Savannah, Ga.	876 65	Sept. 10, 1873
Samuel C. McPherson's executor	Chase, Hartley & Colman	Washington, D. C.	June 4, 1873	57	Georgia	14,193 00	Sept. 10, 1873
		do	June 2, 1873	40	St. Landry Parish, La.	7,080 00	Sept. 12, 1873

C.—List of awards of the United States Court of Claims, for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales lowered.	Where captured.	Amount paid.	Date of payment.
	Name.	Residence.					
Oakley H. Bynum.....	Carlisle and McPherson.	Washington, D. C.	June 2, 1873	23	Louisiana.....	\$4,405 87	Sept. 19, 1873
John E. Moncreux.....	do	do	June 4, 1873	28	Mississippi.....	6,638 11	Sept. 10, 1873
James Gody's administrator.	J. J. Wood	do	June 2, 1873	26	Savannah, Ga.....	4,538 58	Oct. 2, 1873
James R. Johnson's administrator.	R. M. Corwine	Cincinnati, Ohio	June 4, 1873	100	Pulaski County, Ark	30,539 63	Oct. 18, 1873
James P. Ashford's ex-ecutors.	Bartley and Casey	Washington, D. C.	June 4, 1873	83	Mississippi.....	23,589 43	Oct. 29, 1873
Abraham A. Solomons.	T. J. D. Fuller	do	June 2, 1873	97	Savannah, Ga.....	4,733 97	Nov. 15, 1873
Charles Hill.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	June 4, 1873	215	do	37,693 95	Nov. 17, 1873
William Battersby.....	do	do	May 26, 1873	419	do	87,013 67	Nov. 17, 1873
William Battersby and Octavius Cohen.	do	do	May 26, 1873	34	do	7,880 86	Nov. 17, 1873
William Battersby and Andrew Lov.	do	do	May 26, 1873	17	do	3,940 43	Nov. 17, 1873
Carl W. Helms.....	do	do	May 19, 1873	225	do	40,747 83	Nov. 17, 1873
Charles Green.....	do	do	May 26, 1873	675	do	155,554 89	Nov. 17, 1873
E. W. Marshall, J. N. Beach, and S. Root.	do	do	May 19, 1873	177	do	31,033 41	Nov. 17, 1873
Augustus P. Wetter, trustee of Margaret Telfair.	do	do	June 4, 1873	51	do	8,941 83	Nov. 17, 1873
Charles Wilson, Edward Padellford's ex-ecutors, et al.	do	do	May 5, 1873	23	do	4,038 59	Nov. 17, 1873
Edward P. Scott, executor of Isaac Scott.	Carlisle & McPherson.	Washington, D. C.	June 2, 1873	514	do	9,089 49	Nov. 17, 1873
Do.....	do	do	June 2, 1873	104	do	18,924 32	Nov. 17, 1873
Henry D. Weed and George Cornwell.	do	do	June 2, 1873	355	do	62,943 15	Nov. 17, 1873
John Scudder's administrator.	do	do	May 19, 1873	1423	do	249,437 18	Nov. 17, 1873
Andrew J. Miller.....	Owen & Wilson.	do	June 2, 1873	41	do	9,503 39	Nov. 18, 1873
E. S. Lathrop, surviving partner of D. & E. S. Lathrop.	Cooley and Clarke.	do	May 19, 1873	156	do	29,553 43	Nov. 22, 1873
Mary E. Rose, administratrix of Meaduck Jones.	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	May 19, 1873	32	do	5,410 56	Dec. 11, 1873
Carlisle & McPherson.	do	Washington, D. C.	Dec. 15, 1873	220	Louisiana.....	34,367 98	Dec. 23, 1873

Aaron Wilbur's executor.	Glasse & Weed	New York and Washington, D.C.	Jan. 5, 1874	96	Savannah, Ga.	22,251 84	Apr. 8, 1874
James Gallaudet	Stewart, Riddle, Leek & Stanton.	Washington, D.C.	Jan. 5, 1874	32	do	7,417 28	Apr. 9, 1874
William Battersby	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	May 26, 1873	2,779	do	487,242 07	Apr. 9, 1874
Thomas S. Metcalf's executor.	Black, Lamon & Co.	Washington, D.C.	Jan. 5, 1874	14	New Orleans, La.	1,617 56	Apr. 10, 1874
James W. Burbridge	William Rose, use of J. J. Weed	do	Jan. 5, 1874	25	Savannah, Ga.	5,794 75	Apr. 11, 1874
B. Stewart.	do	do	Jan. 5, 1874	9	do	2,086 11	Apr. 11, 1874
Rose & Arkwright, use of J. H. Stewart.	Hughes, Denver & Peck.	do	June 2, 1873	3,275	do	579,343 51	Apr. 13, 1874
Gazaway B. Lamar.	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	May 19, 1873	507	do	88,892 31	Apr. 20, 1874
Alfred L. Taylor	Thomas Wilson.	Washington, D.C.	Jan. 5, 1874	14	Charleston, S. C.	3,249 54	Apr. 22, 1874
Martin Luhrs	Bartley & Casey	do	Jan. 19, 1874	60	Mobile, Ala.	10,500 00	Apr. 24, 1874
Thomas Byrne	Hughes, Denver & Peck.	do	Mar. 31, 1873	490	Savannah, Ga.	103,856 86	Apr. 25, 1874
Noble A. Hardee's administrator, John L. Harlee.	Riddle, Leek & Williams.	do	Jan. 19, 1874	22	Georgia	1,760 30	Apr. 25, 1874
Benjamin H. Zellner.	Stewart, Riddle & Leek.	do	Jan. 19, 1874	5	Savannah, Ga.	1,158 95	Apr. 25, 1874
Rosanna Frank	Cooley & Clarke	do	Jan. 19, 1874	143	Saint Landry Parish, La.	27,456 00	Apr. 27, 1874
Robert P. Rayne's administrator.	do	do	Jan. 19, 1874	10	Charleston, S. C.	1,303 30	Apr. 27, 1874
Richard L. North	Thomas Wilson.	do	Jan. 19, 1874	5	Savannah, Ga.	876 65	Apr. 29, 1874
Michele Fichera and Salvadore Fichera.	Black, Lamon & Co.	do	Feb. 23, 1874	22	Floyd County, Ga.	10,571 22	May 27, 1874
Lloyd Beall, use of Samuel Noble.	Stewart, Riddle & Co.	do	Mar. 16, 1874	5	Savannah, Ga.	1,158 95	June 23, 1874
Jules Massart's administrator.	George Taylor	do	Mar. 30, 1874	53	Craven County, N. C.	11,041 49	July 1, 1874
John H. Nelson	Owen & Wilson.	do	Apr. 6, 1874	32	Washington County, Tex.	16,253 36	July 8, 1874
Hawkins F. Price	Thomas Wilson.	do	Apr. 6, 1874	78	Assumption Parish, La.	11,746 02	July 8, 1874
John D. Grissett.	Hughes, Denver, Peck, and Jules Janin.	do	Apr. 22, 1874	(*)	Vermillion Parish, La.	12,736 91	July 25, 1874
Searing Taylor, executor of Miles Taylor.	Cooley & Clarke	do	Apr. 27, 1874	38	Saint Landry Parish, La.	7,286 00	Aug. 3, 1874
Alenath Isoparte, widow of Jean Laporte.	Sullivan, Billings & Hughes.	New Orleans, La.	Apr. 27, 1874	42	do	8,064 00	Aug. 5, 1874
Austin R. Hawkins	J. A. Willis	do	May 11, 1874	73	New Orleans, La.	14,016 00	Aug. 11, 1874
Elbert Gantt.	Peck & Hurvey	Washington, D.C.	May 11, 1874	(†)	Carroll Parish, La.	13,862 84	Aug. 11, 1874
James N. Brown.	do	do	May 18, 1874	400	do	43,578 50	Aug. 18, 1874
Simon Witkowski.	do	do	do	do	do	do	do

† Molasses and sugar.

* Sugar.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	No. of claims allowed.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Lizzie Hamilton, administratrix of C. D. Hamilton.	George Taylor.	Washington, D. C.	May 18, 1874	62	Madison Parish, La.	\$7,064 66	Aug. 30, 1874	
Benjamin C. Williams.	J. I. McCarty.	do.	May 18, 1874	Part 4 (and 47, 187)	Carroll Parish, La.	7,000 95	Aug. 30, 1874	
George Watts.	do.	do.	May 18, 1874	187	do.	21,307 94	Aug. 30, 1874	
Thomas W. Watts, Jr., and wife.	O. S. Lovell.	do.	May 18, 1874	27	Milliken's Bend, La.	3,076 54	Aug. 30, 1874	
Benjamin R. Thomas and Thos. W. Mason.	Joseph Casey.	do.	May 18, 1874	134	Warren County, Miss.	25,184 50	Aug. 25, 1874	
Catharine Carson, executrix of James G. Carson.	Bartley & Casey.	do.	May 18, 1874	6	Carroll Parish, La.	843 00	Aug. 25, 1874	
F. W. Boyd, executor of James Bailey.	do.	do.	May 18, 1874	347	do.	37,350 92	Aug. 27, 1874	
Allen Jones.	do.	do.	May 18, 1874	43	Madison Parish, La.	4,809 68	Aug. 27, 1874	
Henry Peycheand, assignee of Bellecoque, Noblom & Co.	George Taylor and A. S. Meguire.	do.	May 18, 1874	1,542	Louisiana.	296,064 00	Sept. 1, 1874	
Louise C. Purdy, administratrix of Rice C. Ballard.	Bartley & Casey.	do.	May 18, 1874	169	do.	42,513 48	Sept. 5, 1874	
O. T. Morgan, executor of Oliver J. Morgan.	do.	do.	May 18, 1874	283	Carroll Parish, La.	21,870 68	Sept. 9, 1874	
Johnson et al, representatives of O. J. Morgan.	Carlisle & McPherson.	do.	May 18, 1874	105	do.	11,964 35	Sept. 10, 1874	
John Quinlan, executor of D. O. Grady.	Fuller & Chapman, Jr.	do.	Apr. 1, 1872	.....	Mobile, Ala.	4,181 40	Feb. 25, 1875	Reserved as internal-revenue tax.
Joanna Monlon.	T. J. D. Foller.	do.	May 1, 1871	.....	do.	171 70	Mar. 4, 1875	Do.
Lorenzo T. Potter and Eliza Potter.	D. N. Cooley.	do.	June 15, 1868	.....	Charleston, S. C.	234 00	Mar. 9, 1875	Do.
Asher Ayers.	Hughes, Denver & Peck.	do.	Apr. 1, 1872	.....	Savannah, Ga.	9,039 84	Mar. 10, 1875	Do.
Alexander Abrams.	do.	do.	Apr. 8, 1873	.....	do.	87 84	Mar. 10, 1875	Do.
William B. Adams.	do.	do.	May 8, 1873	.....	do.	1,043 18	Mar. 10, 1875	Do.
George W. Anderson.	do.	do.	Apr. 8, 1873	.....	do.	182 76	Mar. 10, 1875	Do.
Abraham Hacker.	Seward, Hughes, Washington, D. C.	New York	May 8, 1872	.....	do.	1,958 54	Mar. 10, 1875	Do.
David H. Baldwin.	Denver & Peck.	do.	Apr. 8, 1873	.....	do.	732 94	Mar. 10, 1875	Do.
Tobias Brown.	do.	do.	Apr. 11, 1873	.....	do.	105 90	Mar. 10, 1875	Do.
Eudore Cohen.	Hughes, Denver & Peck.	Washington, D. C.	Apr. 15, 1870	.....	Brownsville, Tex.	369 50	Mar. 10, 1875	Do.

Luke Christie.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	May 8, 1872	Savannah, Ga.....	283 52	Mar. 10, 1875	Do.
Philip Delany and Davis Greenfield.	do	do	Feb. 7, 1871	do	1,808 74	Mar. 10, 1875	Do.
Max A. Dauphine.....	Hughes, Denver & Peck.	Washington, D. C.	Nov. 29, 1870	Mobile, Ala.....	959 50	Mar. 10, 1875	Do.
William Dugan.....	do	do	Mar. 20, 1871	Savannah, Ga.....	9 76	Mar. 10, 1875	Do.
Lawrence Del Giro.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	Apr. 22, 1872	do	62 60	Mar. 10, 1875	Do.
Levi De Witt and Rich- ard Morgan.....	do	do	Apr. 8, 1872	do	521 86	Mar. 10, 1875	Do.
George C. Freeman, ad- ministrato.	do	do	Apr. 15, 1872	do	3,250 08	Mar. 10, 1875	Do.
Lewis Fried.....	do	do	Mar. 20, 1871	do	229 06	Mar. 10, 1875	Do.
James Foley.....	do	do	Mar. 11, 1872	do	78 08	Mar. 10, 1875	Do.
Michael Gordon.....	Hughes, Denver & Peck.	Washington, D. C.	Mar. 20, 1871	do	53 56	Mar. 10, 1875	Do.
Charlotte M. E. Gallie.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	Apr. 24, 1871	do	1,123 16	Mar. 10, 1875	Do.
Thomaseo B. Hoyt for use of J. M. Latta.....	Hughes, Denver & Peck.	Washington, D. C.	Mar. 27, 1871	Baldwin, Fla.....	29 54	Mar. 10, 1875	Do.
David Harrison and Thomas Harrison.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	May 15, 1871	Savannah, Ga.....	3,015 84	Mar. 10, 1875	Do.
John F. Hamilton.....	do	do	Mar. 11, 1872	do	887 16	Mar. 10, 1875	Do.
Harry Hayn.....	do	do	Mar. 11, 1872	do	3,170 32	Mar. 10, 1875	Do.
Nelson Anderson.....	T. J. D. Fuller.....	Washington, D. C.	Feb. 22, 1869	Charleston, S. C.....	173 20	Mar. 10, 1875	Do.
Charles R. Gelfuss.....	do	do	Feb. 29, 1869	do	33 29	Mar. 10, 1875	Do.
Diedrich Muller.....	do	do	Feb. 29, 1871	do	24 66	Mar. 10, 1875	Do.
Alexander Stoddart.....	do	do	Apr. 24, 1871	Mobile, Ala.....	1,243 38	Mar. 10, 1875	Do.
Frederick M. Scharfer.....	do	do	May 24, 1869	Charleston, S. C.....	124 88	Mar. 10, 1875	Do.
Minna Berg.....	Stewart, Middle & Leak.	do	Apr. 25, 1870	Savannah, Ga.....	663 68	Mar. 11, 1875	Do.
William Pollard.....	do	do	May 26, 1869	do	85 80	Mar. 11, 1875	Do.
Samuel Worthington.....	Bartley, Stanton, Carlish & McPherson.	do	Mar. 13, 1871	Washington County, Miss.	1,819 29	Mar. 12, 1875	Do.
Alfred Abrams.....	Owen & Wilson.....	do	Feb. 13, 1871	Charleston, S. C.....	7 38	Mar. 13, 1875	Do.
Louis DeHebian.....	Hine & Wilson.....	do	May 22, 1871	Yilmington, N. C.....	1,170 40	Mar. 13, 1875	Do.
Herman Bulwinkle.....	Thomas Wilson.....	do	May 8, 1872	Charleston, S. C.....	322 28	Mar. 13, 1875	Do.
Nicholas Culliton.....	Owen & Wilson.....	do	May 26, 1870	do	59 18	Mar. 13, 1875	Do.
John Fitzgerald.....	Cox & Co., Owen & Wilson.	do	Apr. 11, 1870	Savannah, Ga.....	18 78	Mar. 13, 1875	Do.
Edward Fordham.....	Owen & Wilson.....	do	Feb. 22, 1869	Charleston, S. C.....	59 56	Mar. 13, 1875	Do.
John Spain.....	Lewis & Cox, Owen & Wilson.	New York and Washington, D.C.	May 9, 1870	Savannah, Ga.....	50 00	Mar. 13, 1875	Do.
James A. Seddon.....	Ewing, Helen & Wil- son.	Washington, D. C.	Apr. 24, 1871	Texas Parish, La.....	1,500 78	Mar. 13, 1875	Do.
Moses Vanderhorst.....	Owen & Wilson.....	do	Apr. 24, 1870	Charleston, S. C.....	26 90	Mar. 13, 1875	Do.
William T. Porter.....	do	do	Apr. 24, 1871	do	213 52	Mar. 13, 1875	Do.
Elliott Higgins.....	Seward, Hughes, Denver & Peck.	New York and Washington, D.C.	Apr. 4, 1870	Savannah, Ga.....	444 96	Mar. 13, 1875	Do.
William Hunter.....	do	do	Apr. 8, 1872	do	195 20	Mar. 13, 1875	Do.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Sales allowed.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Ellen M. Kennedy	Seward, Hughes, Denver & Peck.	New York and Washington, D. C.	Apr. 11, 1870	.....	Savannah, Ga.	\$6 27	Mar. 13, 1875	Reserved as internal-revenue tax.
William Lattimore	do	do	May 8, 1872	.....	do	39 04	Mar. 13, 1875	Do.
James W. Lathrop and Harvey W. Lathrop.	do	do	Apr. 15, 1872	.....	do	244 14	Mar. 13, 1875	Do.
William Lindon	do	do	May 13, 1872	.....	do	73 84	Mar. 13, 1875	Do.
Bugh Logan, administrator of Bridget Logan.	do	do	Apr. 11, 1870	.....	do	531 08	Mar. 13, 1875	Do.
Andrew Low	do	do	Apr. 22, 1872	.....	do	94 105 70	Mar. 13, 1875	Do.
Edward Lovell	do	do	May 8, 1872	.....	do	237 51	Mar. 13, 1875	Do.
Lovell & Lattimore	do	do	May 8, 1872	.....	do	290 63	Mar. 13, 1875	Do.
Mix & Co.	do	Washington, D. C.	May 26, 1871	.....	Grand Junction, Tenn.	60 00	Mar. 13, 1875	Do.
James McDonald	do	New York and Washington, D. C.	Mar. 13, 1871	.....	Savannah, Ga.	39 04	Mar. 13, 1875	Do.
Margaret Mangen	do	do	Apr. 11, 1870	.....	do	78 08	Mar. 13, 1875	Do.
Theodore B. Marshall and George S. Marshall.	do	do	Apr. 8, 1872	.....	do	819 84	Mar. 13, 1875	Do.
Ramon Molina	do	do	Feb. 30, 1871	.....	do	234 24	Mar. 13, 1875	Do.
William J. Myers, Son & Co.	do	do	May 22, 1871	.....	do	2, 347 52	Mar. 13, 1875	Do.
Terence Nugent, Jr.	do	do	Mar. 20, 1871	.....	do	106 62	Mar. 13, 1875	Do.
Samuel F. O'Neill	do	do	Apr. 15, 1872	.....	do	175 68	Mar. 13, 1875	Do.
George O'Connell	do	do	Apr. 4, 1870	.....	do	175 38	Mar. 13, 1875	Do.
Antonio Onco	do	do	May 9, 1870	.....	do	315 08	Mar. 13, 1875	Do.
Thomas P. O'Connell	do	do	Apr. 8, 1872	.....	do	58 56	Mar. 13, 1875	Do.
James P. O'Connell	do	do	Apr. 8, 1872	.....	do	54 56	Mar. 13, 1875	Do.
Samuel Whitford and H. A. Richmond's administrator.	do	do	Apr. 19, 1872	.....	do	513 32	Mar. 13, 1875	Do.
Louis Roubicek	do	do	Dec. 5, 1870	.....	do	117 12	Mar. 13, 1875	Do.
Jacob Rosenfeld	do	do	Apr. 11, 1870	.....	do	105 90	Mar. 13, 1875	Do.
John Rosenthal	do	do	Apr. 11, 1870	.....	do	383 11	Mar. 13, 1875	Do.
Pedro S. Scharer	do	do	Feb. 20, 1871	.....	do	2, 669 11	Mar. 13, 1875	Do.
Charles Schwarz	do	do	Apr. 11, 1870	.....	do	98 93	Mar. 13, 1875	Do.
Leazar Strauss	Do Zeng, Stanton & Peck.	Washington, D. C.	Mar. 20, 1871	.....	do	324 08	Mar. 13, 1875	Do.
John Stevenson	Seward, Hughes, Denver & Peck.	do	Apr. 15, 1872	.....	do	107 30	Mar. 13, 1875	Do.
Horace B. Tebbetts	Hughes, Denver & Peck.	do	May 3, 1870	.....	Carroll Parish, La.	107 64	Mar. 13, 1875	Do.

George Taylor and William Tipper, The Hebrew Congregation.	Seward, Hughes, Denver & Peck, do.	New York and Washington, D.C. do.	Apr. 10, 1871.	.....	Savannah, Ga.	488 00	Mar. 13, 1875	Do
Gustave A. Wirth	Hughes, Denver & Peck, do.	Washington, D.C. do.	Jan. 23, 1871.	.....	do.	68 32	Mar. 13, 1875	Do.
James J. Waring	do.	Washington, D.C. do.	Feb. 5, 1872.	.....	Mobile, Ala.	242 40	Mar. 13, 1875	Do.
Stephen Watson	Seward, Hughes, Denver & Peck, do.	New York and Washington, D.C. do.	Apr. 8, 1872.	.....	Savannah, Ga.	146 40	Mar. 13, 1875	Do.
John R. Wilder	do.	do.	May 15, 1871.	.....	do.	4, 069 80	Mar. 13, 1875	Do.
Robert Williams	do.	do.	May 8, 1872.	.....	do.	749 84	Mar. 13, 1875	Do.
Arnon Wilbur	do.	do.	Apr. 11, 1870.	.....	do.	390 40	Mar. 13, 1875	Do.
Henry Wurzburg and S. Witkowski.	do.	do.	May 8, 1872.	.....	do.	995 52	Mar. 13, 1875	Do.
Ephraim Zacharias	do.	do.	Apr. 10, 1870.	.....	do.	3, 347 66	Mar. 13, 1875	Do.
Christian Année	Cooley & Clarke	Washington, D.C. do.	May 9, 1870.	.....	do.	283 04	Mar. 13, 1875	Do.
Wolfe Barnett	do.	do.	Apr. 11, 1870.	.....	Charleston, S. C.	51 66	Mar. 13, 1875	Do.
Christian L. Blaise	do.	do.	Mar. 11, 1872.	.....	Savannah, Ga.	179 72	Mar. 13, 1875	Do.
Henry Bohrens	do.	do.	Mar. 6, 1871.	.....	Charleston, S. C.	70 52	Mar. 13, 1875	Do.
Forl. Brown	Rice & Weed	Georgia and Washington, D.C. do.	Mar. 20, 1871.	.....	do.	31 52	Mar. 13, 1875	Do.
James T. Carrull	Cooley & Clarke	Washington, D.C. do.	May 23, 1870.	.....	Savannah, Ga.	120 25	Mar. 13, 1875	Do.
Mary A. Cherrill	do.	do.	June 15, 1868.	.....	Charleston, S. C.	14 80	Mar. 13, 1875	Do.
John Chaves, administrator H. A. Chaves.	do.	do.	May 26, 1871.	.....	do.	63 04	Mar. 13, 1875	Do.
H. W. Dorre and A. Seckendorf.	do.	do.	Apr. 11, 1870.	.....	do.	107 06	Mar. 13, 1875	Do.
George T. Drew	do.	do.	Apr. 4, 1870.	.....	do.	51 66	Mar. 13, 1875	Do.
Anthony Fernandez	do.	do.	Mar. 13, 1871.	.....	Savannah, Ga.	1, 953 00	Mar. 13, 1875	Do.
Erastus Foster	do.	do.	Apr. 29, 1872.	.....	do.	1, 151 63	Mar. 13, 1875	Do.
Henry Fields	do.	do.	May 3, 1870.	.....	Mobile, Ala.	718 10	Mar. 13, 1875	Do.
John L. Fenwick	do.	do.	Mar. 14, 1870.	.....	Savannah, Ga.	48 80	Mar. 13, 1875	Do.
Simon Fess and James Mintz.	do.	do.	Apr. 4, 1870.	.....	Savannah, Ga.	52 64	Mar. 13, 1875	Do.
William Grant	D. N. Cooley and W. J. Tobias.	do.	May 10, 1869.	.....	Charleston, S. C.	48 18	Mar. 13, 1875	Do.
August Gellifus	Cooley & Clarke and W. J. Tobias.	do.	Apr. 11, 1870.	.....	do.	29 52	Mar. 13, 1875	Do.
William H. Greene	do.	do.	May 23, 1870.	.....	do.	140 00	Mar. 13, 1875	Do.
Erastus Henry	do.	do.	Apr. 2, 1872.	.....	do.	356 52	Mar. 13, 1875	Do.
Robert H. Harney	do.	do.	Apr. 15, 1872.	.....	Savannah, Ga.	183 76	Mar. 13, 1875	Do.
Daniel Haas	do.	do.	Apr. 18, 1870.	.....	Charleston, S. C.	90 14	Mar. 13, 1875	Do.
William Hunt	do.	do.	May 22, 1871.	.....	do.	709 30	Mar. 13, 1875	Do.
Richard Harrison	do.	do.	Mar. 11, 1872.	.....	do.	313 88	Mar. 13, 1875	Do.
George S. Holmes	do.	do.	Mar. 20, 1871.	.....	do.	47 28	Mar. 13, 1875	Do.
John C. Schreinet	do.	do.	Mar. 20, 1871.	.....	do.	15 76	Mar. 13, 1875	Do.
Jean Saureste	De Zang & Stanton.	do.	Apr. 15, 1872.	.....	Savannah, Ga.	419 68	Mar. 13, 1875	Do.
Jacob Cohen	George Taylor, McCarty Rice and Merriam.	Savannah and Washington, D.C. do.	Jan. 15, 1872.	.....	do.	31 30	Mar. 13, 1875	Do.
.....	do.	do.	Apr. 17, 1871.	.....	do.	156 16	Mar. 13, 1875	Do.
Jane Parker, administratrix of Hermon Parker.	Cooley & Clarke	Washington, D.C. do.	Apr. 22, 1872.	.....	Mobile, Ala.	323 20	Mar. 13, 1875	Do.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales allowed.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Frederick Jager	D. N. Cooley and T. Wilson.	Washington, D. C.	Apr. 11, 1870	.....	Charleston, S. C.	\$287 82	Mar. 15, 1875	Reserved as internal-revenue tax.
James H. Johnson	Cooley & Clarke	do.	Mar. 11, 1872	.....	do.	1, 333 52	Mar. 15, 1875	Do.
Benjamin Manton	do.	do.	May 8, 1871	.....	do.	338 66	Mar. 15, 1875	Do.
James Melvin	do.	do.	May 9, 1870	.....	do.	10 76	Mar. 15, 1875	Do.
Catharine Martin	do.	do.	Apr. 11, 1870	.....	Savannah, Ga.	19 52	Mar. 15, 1875	Do.
William McIntyre and William McIntyre	do.	do.	Apr. 1, 1872	.....	do.	242 52	Mar. 15, 1875	Do.
Ralph McIntyre	do.	do.	Apr. 4, 1870	.....	do.	408 88	Mar. 15, 1875	Do.
Jacob Mills	do.	do.	Apr. 4, 1870	.....	Charleston, S. C.	59 04	Mar. 15, 1875	Do.
David Mathews	do.	do.	Apr. 11, 1870	.....	do.	7 38	Mar. 15, 1875	Do.
Mary McManus	do.	do.	Apr. 4, 1870	.....	do.	29 52	Mar. 15, 1875	Do.
D. McSwiney	do.	do.	Apr. 11, 1870	.....	do.	14 76	Mar. 15, 1875	Do.
Samuel S. Miller	Rice & McCarty, Weed and Clarke.	do.	Apr. 11, 1870	.....	Savannah, Ga.	58 56	Mar. 15, 1875	Do.
William D. Oliveira and Ellen M. Oliveira	Cooley & Clarke.	do.	Mar. 13, 1871	.....	do.	39 04	Mar. 15, 1872	Do.
James O. Kaffie	do.	do.	Dec. 6, 1869	.....	do.	97 60	Mar. 15, 1875	Do.
Catharine Peterson	do.	do.	Jan. 15, 1872	.....	Charleston, S. C.	24 78	Mar. 15, 1875	Do.
William A. Rook	do.	do.	Apr. 11, 1870	.....	do.	118 08	Mar. 15, 1875	Do.
Henry Schaben	do.	do.	Apr. 11, 1870	.....	Savannah, Ga.	439 20	Mar. 15, 1875	Do.
Henry Steitz	D. N. Cooley	do.	Apr. 4, 1870	.....	Charleston, S. C.	150 49	Mar. 15, 1875	Do.
Charles Schubert and Margaret Schubert	Cooley & Clarke	do.	Apr. 24, 1871	.....	do.	48 80	Mar. 15, 1875	Do.
Tobias Soott	do.	do.	Apr. 4, 1870	.....	do.	14 76	Mar. 15, 1875	Do.
Joseph Saporitas	do.	do.	Apr. 4, 1870	.....	do.	105 17	Mar. 15, 1875	Do.
Daniel Stinclair	Weed & Clarke.	do.	Mar. 20, 1871	.....	do.	63 04	Mar. 15, 1875	Do.
Jolia Thompson and William Kobb	Cooley & Clarke	do.	Apr. 11, 1870	.....	do.	50 22	Mar. 15, 1875	Do.
Eldo F. Tock	do.	do.	Apr. 1, 1872	.....	do.	61 32	Mar. 15, 1875	Do.
Reubin E. Wilbur	do.	do.	Apr. 1, 1872	.....	do.	74 44	Mar. 15, 1875	Do.
Leonard Wagner	do.	do.	Apr. 4, 1870	.....	do.	63 80	Mar. 15, 1875	Do.
Joseph White	do.	do.	Mar. 13, 1869	.....	Savannah, Ga.	276 74	Mar. 15, 1875	Do.
Henry West	do.	do.	June 15, 1868	.....	Charleston, S. C.	14 80	Mar. 15, 1875	Do.
Adolph B. Wexlow	do.	do.	Apr. 22, 1872	.....	Savannah, Ga.	322 99	Mar. 15, 1875	Do.
Albert Van Dollen	do.	do.	Apr. 11, 1870	.....	Charleston, S. C.	23 14	Mar. 15, 1875	Do.
Henry A. Eator	H. J. Atkinson	do.	Mar. 22, 1869	.....	Louisiana.	1, 054 08	Mar. 15, 1875	Do.
Charles J. Quinby	Crosby & Peck	do.	May 24, 1869	.....	Charleston, S. C.	3, 594 30	Mar. 15, 1875	Do.
Delway B. Wadlington	H. Barnard	New York	Jan. 22, 1872	.....	Mobile, Ala.	968 80	Mar. 15, 1875	Do.
Nathan Bunn	Ward & Barn, E. P. Norton.	do.	Apr. 12, 1870	.....	Savannah, Ga.	219 50	Mar. 15, 1875	Do.

Martin O'Donnell	D. N. Cooley	Washington, D. C	Apr. 11, 1870	.....	Charleston, S. C	36 90	Mar. 15, 1875	Do.
James Armstrong	do	do	June 15, 1868	.....	do	399 60	Mar. 15, 1875	Do.
John Burns	do	do	Apr. 4, 1870	.....	do	7 38	Mar. 15, 1875	Do.
James Cantwell	do	do	Apr. 8, 1872	.....	do	685 58	Mar. 15, 1875	Do.
Martin Caulfield	do	do	May 9, 1870	.....	do	28 92	Mar. 15, 1875	Do.
Mary Dallas	do	do	Apr. 25, 1870	.....	do	55 16	Mar. 15, 1875	Do.
Philip Hayes	do	do	May 26, 1869	.....	do	17 60	Mar. 15, 1875	Do.
Louis F. Kewster	do	do	Apr. 25, 1870	.....	do	922 34	Mar. 15, 1875	Do.
Henry H. Knece	do	do	May 26, 1869	.....	do	39 42	Mar. 15, 1875	Do.
Kate Keeney and Thomas Keeney	do	do	June 15, 1868	.....	do	14 74	Mar. 15, 1875	Do.
Rudolph Lohsiger	do	do	May 9, 1870	.....	do	55 16	Mar. 15, 1875	Do.
Francis Perry	do	do	Apr. 25, 1870	.....	do	15 76	Mar. 15, 1875	Do.
James Rudolph	do	do	June 15, 1868	.....	do	29 60	Mar. 15, 1875	Do.
Calvin L. Gilbert	Stewart, Riddle & Leaki	do	Apr. 5, 1869	.....	Savannah, Ga	234 24	Mar. 15, 1875	Do.
Henry Meinhard and Isaac Meinhard	do	do	May 6, 1872	.....	do	281 70	Mar. 15, 1875	Do.
D. Flanders	do	do	Apr. 8, 1872	.....	do	790 56	Mar. 15, 1875	Do.
Delancy Jenks	Stewart, Riddle & Leaki, and Stanton	do	Apr. 20, 1870	.....	do	29 28	Mar. 15, 1875	Do.
Michael Boley	Stewart, Riddle & Leaki	do	May 1, 1871	.....	do	68 32	Mar. 15, 1875	Do.
John Habersham	Stewart, Riddle & Leaki	do	Apr. 20, 1870	.....	do	97 60	Mar. 15, 1875	Do.
Henry Wayne	Stewart, Riddle & Leaki, and Stanton	do	Apr. 20, 1870	.....	do	136 16	Mar. 15, 1875	Do.
Lewis Ross's estate	Stewart, Riddle & Leaki	do	Apr. 24, 1871	.....	do	40 00	Mar. 15, 1875	Do.
Frederick Chaetonet	Riddle & Miller	do	May 1, 1871	.....	do	125 40	Mar. 15, 1875	Do.
Simon Witkowski	Stewart, Riddle & Leaki	do	May 8, 1872	.....	do	1, 131 68	Mar. 15, 1875	Do.
E. H. Martin	Black, Lamson & Co.	do	May 11, 1872	.....	St. Landry Parish, La	69 12	Mar. 16, 1875	Do.
Warren M. Buntin	do	do	May 16, 1870	.....	Lake Providence, La	371 07	Mar. 16, 1875	Do.
Lazarus Kohn	Chipman & Hoemer	do	May 9, 1870	.....	Savannah, Ga	164 24	Mar. 16, 1875	Do.
Francis J. Ruekh	do	do	Apr. 10, 1871	.....	Charleston, S. C	21 32	Mar. 16, 1875	Do.
Sheldon W. Wight	A. S. Dioso	New York	Apr. 25, 1870	.....	Savannah, Ga	390 40	Mar. 17, 1875	Do.
James Hoenegny	Carlisle & McPherson	Washington, D. C	Apr. 11, 1870	.....	do	136 64	Mar. 17, 1875	Do.
C. R. Miller and J. B. Fellows	do	do	May 20, 1869	.....	Mobile, Ala	1, 010 00	Mar. 17, 1875	Do.
Robert Castell	Riddle & Munsey	do	Feb. 20, 1871	.....	Charleston, S. C	23 64	Mar. 17, 1875	Do.
Richard Kelley, administrator of F. M. Kean	Blair & Dick	do	Apr. 24, 1871	.....	do	47 28	Mar. 17, 1875	Do.
Elie Côté, for use of J. C. Martin	Man & Parsons and Carlisle & McPherson	New York and Washington, D. C	Apr. 15, 1872	.....	do	611 80	Mar. 18, 1875	Do.
Alexander Leckey and Hugh C. Leckey	Carlisle & McPherson	Washington, D. C	May 6, 1871	.....	Leighton, Ala	60 60	Mar. 18, 1875	Do.
James G. Mills	do	do	Feb. 16, 1871	.....	Savannah, Ga	439 20	Mar. 18, 1875	Do.
Thomas R. J. G., and C. T. Mills	do	do	Feb. 13, 1871	.....	do	7, 300 46	Mar. 18, 1875	Do.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales lowered.	Where captured.	Amount paid.	Date of payment.	Remarks.
	Name.	Residence.						
Edward Padelford's estate.	Carlisle & McPherson.	Washington, D. C.	Apr. —, 1873	.....	Savannah, Ga.	\$7,933 54	Mar. 18, 1875	Reserved as internal-revenue tax.
Edwin Parsons	do	do	Apr. 20, 1873	.....	do	902 58	Mar. 18, 1875	Do.
George Parsons	do	do	Apr. 22, 1873	.....	do	693 35	Mar. 18, 1875	Do.
J. W. Morrell, M. Ross, attor. of A. Smith	do	do	Apr. 23, 1870	.....	do	250 40	Mar. 18, 1875	Do.
S. Alexander & Smith	do	do	May 9, 1870	.....	do	900 00	Mar. 18, 1875	Do.
Charles H. Smith	do	do	Apr. 15, 1872	.....	do	1,683 89	Mar. 18, 1875	Do.
Benjamin O. Thayer	do	do	Apr. 23, 1870	.....	Marango Co., Ala.	1,425 88	Mar. 18, 1875	Do.
Francis T. Willis	do	do	Apr. 23, 1871	.....	Savannah, Ga.	1,307 84	Mar. 18, 1875	Do.
W. W. Worthington	Bartley & Stanton, Carlisle & McPherson.	do	Apr. 1, 1872	.....	Washington County, Miss.	496 17	Mar. 18, 1875	Do.
James Kilduff	Carlisle & McPherson.	do	June 2, 1870	.....	Mobile, Ala.	1,545 30	Mar. 29, 1875	Do.
Home Insurance Company.	Sebart, Hughes, Dart & Peck.	New York and Washington, D. C.	June 2, 1873	202	Savannah, Ga.	35,529 58	Apr. 3, 1875	
Southern Insurance Co	do	do	June 2, 1873	155	do	97,176 15	Apr. 3, 1875	
James H. Houston	T. W. Bartley	Washington, D. C.	Jan. 25, 1875	55	St. Landry Parish, La.	10,590 00	May 5, 1875	
James Croas and Edward Croas.	Sebart, Hughes, Dart & Peck.	New York and Washington D. C.	Jan. 25, 1875	56	Savannah, Ga.	9,818 46	May 8, 1875	
Julia R. Peterson ad- ministratrix of Ealt Peterson.	Paine & Grafton	Washington, D. C.	Feb. 15, 1875	272	Ark.	16,463 78	May 17, 1875	
Samuel C. Cabell	C. W. Coleman	do	Mar. 31, 1873	117	Savannah, Ga.	15,619 75	May 25, 1875	
Stephen B. Moore	A. L. Merdman	do	Apr. 5, 1875	(*)	New Bern, N. C.	13,407 50	July 15, 1875	
John I. Sisson	Cooley & Clark	do	Apr. 26, 1875	(f)	New Iberia, La.	9,326 45	Aug. 4, 1875	
John L. Villalunga	Soward Hughes, Dart & Peck.	New York and Washington, D. C.	May 10, 1875	196	Savannah, Ga.	40,588 75	Aug. 25, 1875	
Fred. A. Molese ad- ministrador of Eve- lina M. Henner.	T. H. N. McPherson.	Washington, D. C.	May 24, 1875	55	Washington County, Miss.	6,158 35	Aug. 25, 1875	
Alfred W. Eriks	Bartley & Casey	do	May 24, 1875	40	Warren Co., Miss.	7,102 00	Aug. 25, 1875	
Thomas A. Marshall	do	do	May 24, 1875	22	do	3,906 10	Aug. 25, 1875	
John H. Newman	do	do	May 24, 1875	50	do	8,877 50	Aug. 25, 1875	
John Willis	do	do	May 24, 1875	125	Yazoo Co., Miss.	92,183 75	Aug. 25, 1875	
E. E. Willis	do	do	May 24, 1875	40	Warren Co., Miss.	7,102 00	Aug. 25, 1875	
Charles Young	do	do	May 24, 1875	116	Clallorn Co., Miss.	20,525 80	Aug. 25, 1875	
Anna J. Jones	George Taylor	do	May 24, 1875	100	Warren Co., Miss.	17,735 00	Aug. 25, 1875	
Amelia S. Hurwell	Bartley & Casey	do	May 24, 1875	118	do	20,950 90	Aug. 25, 1875	
William Harrison	do	do	May 24, 1875	70	Jefferson Co., Miss.	12,468 80	Aug. 25, 1875	
	do	do	May 24, 1875	40	Yazoo Co., Miss.	35,510 00	Aug. 25, 1875	

Juliet Glass	do	do	May 24, 1875	18	Warren Co., Miss.	Aug. 30, 1875
Nanette Switzer, (late Abell)	do	do	May 24, 1875	73	Washington County, Miss.	Aug. 30, 1875
Jane Jett and Thomas H. Jett, Jr., executors of Thomas H. Jett.	do	do	May 24, 1875	95	Warren Co., Miss.	Aug. 30, 1875
Thomas V. Barry, administrator of Thos. Barry.	George Taylor	do	May 24, 1875	149	Claborne Co., Miss.	Sept. 1, 1875
John T. Moore, administrator of Mary P. Marye.	do	do	May 24, 1875	45	Sunflower Co., Miss.	Sept. 1, 1875
William E. Hall	do	do	May 24, 1875	300	Claborne Co., Miss.	Sept. 1, 1875
John R. McAlpine	do	do	May 24, 1875	100	do	Sept. 1, 1875
Alexander Hutchinson	do	do	May 24, 1875	130	do	Sept. 1, 1875
James A. Hutchinson	do	do	May 24, 1875	43	do	Sept. 1, 1875
Benjamin Harwood	do	do	May 24, 1875	75	do	Sept. 1, 1875
Benj. G. Humphreys, administrator of Francis Ragadale.	do	do	May 24, 1875	100	Sunflower Co., Miss.	Sept. 1, 1875
Duff Green	Bartley & Casey	do	May 24, 1875	19	Warren Co., Miss.	Sept. 1, 1875
Richard Taylor	do	do	May 24, 1875	6	do	Sept. 1, 1875
John L. Hebron	do	do	May 24, 1875	30	do	Sept. 1, 1875
Ann Eliza Kouth	C. E. Hovey	do	May 24, 1875	75	Saint Joseph, La.	Sept. 6, 1875
Edward Thomas Parker, father testator, mentary executor of John K. Elgee.	Carlisle & McPherson.	do	May 17, 1875	573	Buffalo Bayou, Miss.	Sept. 10, 1875
Isaac R. Wade	T. H. N. McPherson.	do	May 24, 1875	31	Jefferson Co., Miss.	Oct. 1, 1875
Thomas Kidd, administrator of Matthew A. Bolls.	Bartley & Casey	do	May 24, 1875	64	Hinds County, Miss.	Oct. 23, 1875
Joel Dean and Robert Dean Burrill, firm of William Dean & Co.	Seward, Hughes, New York and Washington, D. C.	do	Feb. 6, 1875	305	Savannah, Ga.	Nov. 13, 1875
Mary J. Davis	George Taylor	Washington, D. C.	Mar. 15, 1875	18	Noxubee Co., Miss.	Dec. 23, 1875
Jamies Meagher	Carlisle & McPherson.	do	May 24, 1875	45	Hinds County, Miss.	Dec. 23, 1875
Margaret Roach, executrix of Benjamin Roach.	T. H. N. McPherson.	do	Jan. 6, 1874	69	Washington County, Miss.	May 3, 1875
Louisa C. Medway	Thomas Wilson	do	Feb. 7, 1876	95	Wilmington, N. C.	May 15, 1875
Mary B. Habersham, executrix of Robert Habersham.	Hughes, Denver & Peck.	do	Apr. 13, 1874	77	Savannah, Ga.	May 17, 1875
John R. Raymond, assignee in bankruptcy of J. W. Maybun.	S. E. Jenner	do	May 24, 1875	400	Warren County, Miss.	May 24, 1876
E. K. McLean	Bartley & Casey	do	May 24, 1875	21	Carroll County, Miss.	May 24, 1876
George Hawkins	do	do	May 24, 1875	15	Warren County, Miss.	May 24, 1876

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Roadn and rent.

C.—List of awards of the United States Court of Claims for proceeds of captured and abandoned property, &c.—Continued.

Name of claimant.	Attorney of record.		Date of judgment.	Bales lost.	Where captured.	Amount paid.	Date of payment.	mar. a.
	Name.	Residence.						
James J. Cowan, administrator of John Cowan, deceased.	Bartley & Casey	Washington, D. C.	May 24, 1875	130	Warren County, Miss.	\$21,306 00	May 24, 1876	
James J. Cowan, administrator of Sarah Cowan, deceased.	Bartley & Casey and O. S. Lovell.	do	May 24, 1875	48	do	8,522 40	May 24, 1876	
J. E. Brabston.	do	do	May 24, 1875	32	do	5,081 60	May 24, 1876	
Charlotte Spear.	do	do	May 24, 1875	70	do	12,428 50	May 24, 1876	
Ellen D. Batchelor	Bartley & Jenner.	do	May 24, 1875	51	do	9,053 05	May 24, 1876	
J. Reese Cook.	Bartley & Casey and O. S. Lovell.	do	May 24, 1875	51	do	7,102 00	May 24, 1876	
Thomas Kidd.	do	do	May 24, 1875	480	Hinds County, Miss.	85,224 00	May 24, 1876	
William F. Smith.	Hughes, Denver & Peck.	do	May 31, 1875	15	Washington County, Miss.	1,679 53	May 24, 1876	
Theodore Beach.	Thomas Wilson	do	Mar. 20, 1876	3	Savannah, Ga.	525 99	June 28, 1876	
Total						9,545,293 83		

D.—List of cotton claims allowed by the Secretary of the Treasury under the fifth section of the act of May 18, 1872.

Name.	Residence.	Attorney.		Sales & claims.	Decision.	Date of decision.	Amount allowed.	Ground of decision, nature of evidence, &c.
		Name.	Residence.					
Joseph Haseord	Columbus, Ga.	Self	Washington, D. C.	46	Allowed.	Apr. 2, 1873	\$3,228 00	Erroneously seized.
John R. Tompkins	Mobile, Ala.	R. W. Walker	Washington, D. C.	6	do	May 9, 1873	\$3,498 32	Do.
William S. Price, sr.	Clarke County, Miss.	Bartley & Jenner	do	7	do	Aug. 2, 1873	502 08	Do.
Lucian B. Lovelace	West Point, Ga.	Chandler & Culver	do	50	do	Aug. 29, 1873	1,815 64	Do.
William Reid	do	do	do	32	do	Aug. 29, 1873	3,095 87	Do.
Joseph E. Buckley	Enterprise, Miss.	Evans & Ford	do	25	do	Aug. 29, 1873	1,885 25	Improperly seized.
Benjamin F. Williamson	Darlington District, S. C.	H. Sherman	do	988	do	Nov. 28, 1873	33,649 15	Erroneously seized.
Hannah Betha's administrator, David W. Betha.	Marion, S. C.	R. W. Walker	do	40	do	Nov. 24, 1873	2,456 52	Do.
Nathan Bass	Rome, Ga.	Chandler & Culver	do	169	do	Nov. 25, 1873	11,528 40	Do.
Hugh McKee's administrator	Butler County, Ala.	P. Phillips	do	57	do	Nov. 25, 1873	4,300 00	Do.
Morgan Cryer	Amite City, La.	Waterson & Crawford	do	37	do	Jan. 30, 1874	1,713 60	Do.
William A. Scott	Auburn, Ala.	A. S. Lovell	do	25	do	Apr. 13, 1874	3,819 53	Do.
Martha A. Oldabne	Aberdeen, Miss.	R. McAllister	do	18	do	Apr. 22, 1874	3,330 92	Do.
A. M. Walker	Columbus, Ga.	Hughes & Co.	do	50	do	Apr. 22, 1874	3,117 76	Do.
George Petten	Manitree, Fla.	J. J. Weed	do	39	do	Apr. 28, 1874	3,707 25	Do.
Thomas W. Sims	Mobile, Ala.	P. Phillips	do	23	do	Apr. 29, 1874	1,756 00	Do.
John W. Floyd	Covington, Ga.	Self	do	52	do	Apr. 29, 1874	3,976 38	Do.
George Sohley's administrator, Charles A. Rowland.	Augusta, Ga.	F. Wilson	do	(*)	do	May 12, 1874	18,506 33	Do.
Ben. Edwards Grey	Dallas County, Ala.	Harlan & Bristow	Louisville, Ky.	50	do	May 23, 1874	3,970 00	Do.
Crockett & Stroud's assignees, John H. Bradley, Jr.	Chester, S. C.	Corwine & Son	Washington, D. C.	103	do	May 23, 1874	5,628 04	Do.
John H. Hamiter et al.	Louisville, Ark.	Bartley & Jenner	do	90	do	June 11, 1874	1,310 55	Do.
Boyd & Oberchain's assignees, Hamilton Boyd.	Lynchburgh, Va.	H. H. Willard	do	160	do	June 27, 1874	13,050 63	Do.
Butt & Foster	Mobile, Ala.	P. Phillips	do	14	do	July 29, 1874	678 38	Do.
Flasch & Hartwell	do	do	do	19	do	July 29, 1874	990 66	Do.
Keen & Scott	do	T. Wilson	do	35	do	Oct. 24, 1874	5,011 55	Do.
Thomas G. Polk	Memphis, Tenn.	G. Moyers	do	8	do	Nov. 27, 1874	784 46	Do.
Henry A. Stealey	Jefferson, Tex.	J. M. Cutts	do	4	do	Dec. 18, 1874	501 76	Do.
Ben. Edwards Grey	Dallas County, Ala.	J. M. Harlan	Louisville, Ky.	106	do	Feb. 6, 1875	8,416 40	Do.
R. N. Green	Polk County, Tex.	W. W. Boyce	Washington, D. C.	3	do	Feb. 23, 1875	7,949 73	Do.
Henry C. Boyd's executor, Henry Loving.	Amherst County, Va.	Henry Loving	Amherst County, Va.	127	do	Feb. 25, 1875	799 88	Do.
Benjamin Easley's administrator, James P. Hambleton.	Atlanta, Ga.	J. P. Hambleton	Atlanta, Ga.	104	do	Mar. 1, 1875	3,549 56	Do.
State of North Carolina	do	T. L. Clingman and J. M. Cutts.	North Carolina and Washington, D. C.	70	Allowed	Mar. 13, 1875	4,495 06	Improperly seized.

* 196 bags

COTTON CLAIMS.

D.—List of cotton claims allowed by the Secretary of the Treasury under the fifth section of the act of May 18, 1872—Continued.

Claimant.		Attorney.		Bales of cotton.	Decision.	Date of decision.	Amount allowed.	Ground of decision, nature of evidence, &c.
Name.	Residence.	Name.	Residence.					
George W. Noble	Montgomery, Ala.	W. H. Beck	Washington, D. C.	11	Allowed	Mar. 18, 1875	\$687 98	Erroneously seized.
James R. Stevens, surviving partner of Reynolds, Stevens & Co.	Brandon, Miss.	Self .....	.....	5	do	Apr. 13, 1875	114 00	Do.
Wesley Ross	Cold Springs, Tex.	Beck & Reed	Washington, D. C.	4	do	May 11, 1875	237 68	Do.
Samuel H. Wild's executors, Horace Williamson, John J. James, and William E. James	Darlington District, S. C.	D. G. McIntosh	Towson, Md.	100	do	June 4, 1875	10,401 30	Do.
Andrew Hoemer	Peoria, Ill.	Ingersoll & Sayre	Washington, D. C.	300	do	Sept. 9, 1875	14,460 00	Improperly seized.
William H. Somerville	Bridgville, Ala.	Lewis & Fullerton	do	5	do	Sept. 23, 1875	223 92	Erroneously seized.
Alexander M. Gillette	Charlotte, N. C.	Chandler & Culver	do	9	do	Oct. 7, 1875	604 13	Do.
Charles W. Snowden's administrators, George H. Snowden and Rebecca Snowden	Escambia County, Ala.	A. F. Randall	do	15	do	Nov. 1, 1875	536 57	Do.
Richard Sykes's administrator A. J. Sykes	Monroe County, Miss.	J. J. Wood	do	(*)	do	Nov. 8, 1875	1,000 00	Improperly seized.
Seth P. Pool	West Point, Miss.	R. McAllister	do	9	do	Nov. 15, 1875	900 00	Do.
Ivory F. Woodman's administrator, Mrs. Francis E. Woodman	New Orleans, La.	W. R. Drinkard	do	101	do	Dec. 1, 1875	1,946 06	Do.
John Kyle's executrix, Elizabeth Withers	Canton, Miss.	W. D. Clements and T. J. D. Fuller	Georgetown, D. C.	100	do	Dec. 1, 1875	1,324 86	Do.
Elizabeth Withers	do	do	do	51	do	Dec. 1, 1875	698 45	Do.
J. W. Flanagan	Rank County, Tex.	H. K. Payne	Washington, D. C.	13	do	Dec. 9, 1875	17 10	Do.
John P. Stoval	Noxubee County, Miss.	R. McAllister	do	14	do	Dec. 13, 1875	150 60	Do.
Charles D. Moody	Russell County, Ala.	Chandler, Morton & Culver	do	12	do	Dec. 15, 1875	914 12	Do.
Albert E. Patterson and Joseph C. Brewer	do	Taylor & Wood	do	8	do	Dec. 15, 1875	944 71	Do.
Thomas A. Heard	Arkadelphia, Ark.	Pike & Johnson	do	20	do	Dec. 15, 1875	464 62	Do.
R. M. Robertson	Marengo County, Ala.	Lander & Merriman	do	925	do	July 19, 1876	3,178 10	Do.
							188,163 57	

* 5,750 pounds of lint.

C

THE RIVER AND HARBOR BILL.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

GIVING

His views upon the bill of the House (H. R. 3022) making appropriations for rivers and harbors.

AUGUST 14, 1876.—Referred to the Committee on Commerce and ordered to be printed.

To the House of Representatives:

In affixing my signature to the river and harbor appropriation bill, (H. R. 3022,) I deem it my duty to announce to the House of Representatives my objection to some features of the bill and the reason why I sign it. If it was obligatory upon the Executive to expend all the money appropriated by Congress, I should return the river and harbor bill with my objections, notwithstanding the great inconvenience to the public interests resulting therefrom, and loss of expenditures from previous Congresses upon incompleting works.

Without enumerating, many appropriations are made for work of purely a private or local interest, in no sense national. I cannot give my sanction to these, and will take care that, during my term of office, no public money shall be expended upon them. There is very great necessity for economy of expenditures at this time, growing out of the loss of revenue likely to arise from a deficiency of appropriations to insure a thorough collection of the same. The reduction of revenue districts, diminution of special agents, and total abolition of supervisors may result in great falling off of the revenues. It may be a question to consider whether any expenditure can well be authorized under the river and harbor appropriation further than to protect work already done and paid for. Under no circumstances will I allow expenditures upon works not clearly national.

U. S. GRANT.

EXECUTIVE MANSION, August 14, 1876.

DIPLOMATIC AND CONSULAR APPROPRIATION BILL.

M E S S A G E

FROM THE

PRESIDENT OF THE UNITED STATES,

IN REGARD TO

Certain portions of the bill (H. R. 1594) making appropriations for the diplomatic and consular service.

AUGUST 15, 1876.—Referred to the Committee on Appropriations and ordered to be printed.

To the House of Representatives :

In announcing, as I do, that I have attached my signature of official approval to the "Act making appropriations for the consular and diplomatic service of the Government for the year ending June 30, 1877, and for other purposes," it is my duty to call attention to a provision in the act directing that notice be sent to certain of the diplomatic and consular officers of the Government "to close their offices."

In the literal sense of this direction, it would be an invasion of the constitutional prerogative and duty of the Executive.

By the Constitution the President "shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present consent, and he shall nominate, and by and with the advice and consent of the Senate shall appoint, ambassadors, other public ministers and consuls," &c.

It is within the power of Congress to grant or withhold appropriation of money for the payment of salaries and expenses of the foreign representatives of the Government.

In the early days of the Government a sum in gross was appropriated, leaving it to the Executive to determine the grade of the officers and the countries to which they should be sent.

Latterly, for very many years, specific sums have been appropriated for designated missions or employments, and, as a rule, the omission by Congress to make an appropriation for any specific post has heretofore been accepted as an indication of a wish on the part of Congress, which the executive branch of the Government respected and complied with.

In calling attention to the passage which I have indicated, I assume that the intention of the provision is only to exercise the constitutional

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prerogatives of Congress over the expenditures of the Government, and to fix a time at which the compensation of certain diplomatic and consular officers shall cease, and not to invade the constitutional rights of the Executive, which I should be compelled to resist; and my present object is not to discuss or dispute the wisdom of failing to appropriate for several offices, but to guard against the construction that might possibly be placed on the language used as implying a right in the legislative branch to direct the closing or discontinuing of any of the diplomatic or consular offices of the Government.

U. S. GRANT.

WASHINGTON, *August 14, 1876.*

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REPAVING PENNSYLVANIA AVENUE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

ASSIGNING

Reasons for withdrawing his approval from the bill of the House (H. R. 4085) for repaving Pennsylvania avenue.

AUGUST 15, 1876.—Referred to the Committee on the District of Columbia and ordered to be printed.

To the House of Representatives :

I herewith return House bill No. 4085 without my approval. The repeal of the clause in the original bill for paving Pennsylvania avenue, fixing the time for the completion of the work by December 1, 1876, is objectionable in this, that it fixes no date when the work is to be completed.

Experience shows that where contractors have unlimited time to complete any given work, they consult their own convenience and not the public good. Should Congress deem it proper to amend the present bill in such manner as to fix the date for the completion of the work to be done by any date between December 1 and close of my official term, it will receive my approval.

U. S. GRANT.

EXECUTIVE MANSION, August 15, 1876.

FORTY-FOURTH CONGRESS OF THE UNITED STATES.

AT THE FIRST SESSION, BEGUN AND HELD AT THE CITY OF WASHINGTON, IN THE DISTRICT OF COLUMBIA, ON MONDAY, THE SIXTH DAY OF DECEMBER, 1875.

AN ACT to repeal part of section five of an act entitled "An act authorizing the repavement of Pennsylvania avenue," approved July nineteenth, eighteen hundred and seventy-six.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all that part of section five of an act entitled "An act authorizing the repavement of Penn-

sylvania avenue," approved July nineteenth, eighteen hundred and seventy-six, which provides "that said pavement shall be fully completed and ready for use December first, eighteen hundred and seventy-six," be and the same is hereby repealed.

MILTON SAYLER,
Speaker of the House of Representatives pro tempore.

T. W. FERRY,
President of the Senate pro tempore.

I certify that this act originated in the House of Representatives.
Attest:

GEO. M. ADAMS,
Clerk.

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CAPT. EDWARD S. MEYER.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

ASSIGNING

Reasons for not approving the bill (H. R. 36) to restore Capt. Edward S. Meyer to the active-list of the Army.

AUGUST 15, 1876.—Referred to the Committee on Military Affairs and ordered to be printed.

To the House of Representatives :

For the reasons stated in the accompanying communications submitted to me by the Secretary of War, I have the honor to return herewith, without my approval, House bill No. 36, entitled "An act to restore the name of Capt. Edward S. Meyer to the active-list of the Army."

U. S. GRANT.

EXECUTIVE MANSION, August 14, 1876.

[H. R. 36.—44th Congress, 1st session.]

In the Senate of the United States, July 14, 1876.—Read twice and referred to the Committee on Military Affairs.

AN ACT to restore the name of Captain Edward S. Meyer to the active-list of the Army.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President be, and he hereby is, authorized to restore to the active-list of the Army the name of Captain Edward S. Meyer, of the Ninth Regiment of Cavalry, who was retired on the twenty-fourth day of August, eighteen hundred and seventy-two, for reason of physical disability, resulting from wounds received at the battle of Chancellorsville, from which he has since sufficiently recovered to return to active duty, and to assign him to any vacancy in his grade now existing, or which may hereafter occur, in any of the cavalry regiments of the Army: Provided, that the time that he has been on the retired-list not to be counted in his service in giving promotion.

MILTON SAYLER,

Speaker of the House of Representatives pro tempore.

T. W. FERRY,

President of the Senate pro tempore.

WAR DEPARTMENT,
Washington City, August 4, 1876.

SIR: I have the honor to return House bill 36, "to restore the name of Captain Edward S. Meyer to the active-list of the Army," and beg to invite your attention to the inclosed report of the Adjutant-General of this date, stating objections to the approval of the bill.

Very respectfully, your obedient servant,

J. D. CAMERON,
Secretary of War.

The PRESIDENT.

ADJUTANT-GENERAL'S OFFICE,
August 4, 1876.

Respectfully returned to the Secretary of War.

Edward S. Meyer served as a private in the Fourth Ohio Volunteers (3 months) from May 4, 1861, to August 18, 1861. He again enlisted as private Nineteenth Ohio Volunteers September 10, 1861, was promoted first lieutenant November 1, 1861, and resigned September 27, 1862. He was commissioned captain One hundred and seventh Ohio Volunteers November 11, 1862; was wounded at Chancellorsville, Va., May 2, 1863, and discharged for physical disability January 1, 1865. He was again mustered into service February 8, 1865, as major Fifth United States Veteran Volunteers, (Hancock's Corps,) and mustered out March 20, 1866. Was brevetted lieutenant-colonel, colonel, and brigadier-general of Volunteers March 13, 1865.

He was appointed captain Thirty-fifth United States Infantry July 28, 1866; became unassigned August 12, 1869; assigned to Nineteenth Infantry August 5, 1870; and transferred to Ninth Cavalry January 1, 1871. Retired August 24, 1872.

July 8, 1869, Captain Meyer applied for retirement on account of wounds received at Chancellorsville May 2, 1863, by which he was incapacitated for active service. No action was then had on the request, pending action by Congress reducing the Army.

October 6, 1869, he asked to be placed on waiting orders, being unfit for duty and no possibility of improvement without going North. He was accordingly relieved from duty and ordered home to await orders.

December 18, 1869, he called on the Secretary of War and asked to be assigned to duty.

January 4, 1870, he again applied to be assigned to duty with some regiment on the frontier, stating that his wound had healed, &c., and asking to withdraw his previous request for retirement; this was accompanied by a similar request from his father, Mr. S. Meyer, of Ohio.

July 29, 1870, he applied the third time to withdraw application for retirement and to be assigned to duty. On January 1, 1871, in accordance with his repeated requests to be assigned to duty, he was assigned to the Ninth Cavalry, serving in Texas. He joined the regiment, and on March 4, 1872, he renewed his former request to be ordered before a retiring board, stating that he found his injuries would not allow him to remain on duty on the frontier; that his disability was constantly increasing, &c. The medical director of the Department approved the request, and added that Captain Meyer's wounds certainly unfitted him for service on the frontier.

April 13, 1872, Senator Sherman joined in requesting retirement of Captain Meyer. He was ordered before the retiring board, and on

August 20, 1872, was examined. The board found Captain Meyer incapacitated for active service, and that said incapacity results from a gun-shot wound received in his lower jaw at the battle of Chancellorsville, Va., May 3, 1863, when captain in One hundred and seventh Ohio Volunteers. He was retired in accordance with the finding.

March 21 and December 6, 1873, Captain Meyer asked restoration to active service and re-appointment as a captain of cavalry, which application was disapproved by the General of the Army.

Pending the action on the bill before Congress, no reports were called for, as to the official facts of record in the War Department, and no evidence has been filed in this office showing that he has sufficiently recovered.

The absence of such evidence, and the fact that after one assignment to active duty he has failed to be sufficiently recovered, are submitted as objections why the bill should not be approved.

E. D. TOWNSEND,
Adjutant-General.

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COIN BALANCES IN THE TREASURY.

LETTER

FROM

THE SECRETARY OF THE TREASURY,

TRANSMITTING,

In compliance with a resolution of the House of Representatives of July 29, 1876, a statement of coin balances in the Treasury of the United States.

JULY 31, 1876.—Referred to the Committee on Banking and Currency.

AUGUST 15, 1876.—Recommitted to the Committee on Banking and Currency and ordered to be printed.

TREASURY DEPARTMENT, July 29, 1876.

SIR: I am in receipt of the resolution of the House of Representatives, dated the 24th instant, requesting me to report to the House, within one week from the passage of the resolution, the amount of gold coin and gold bullion, respectively, in the Treasury and actually owned by the Government, with a full detailed statement of the amount of gold certificates outstanding, gold interest due and unpaid, called bonds, and all other obligations payable in gold on demand on that date; and, in reply, I have the honor to state that the available coin balance at the close of business on the 24th instant was \$61,158,223.45, made up as follows:

Gold coin	\$41,627,450 56	
Gold bullion	11,030,095 87	
Silver coin and bullion	8,500,677 02	\$61,158,223 45

Against which there were matured obligations payable on demand as follows:

Coin interest	\$10,456,386 29	
Bonds called or matured, and interest thereon	3,020,627 51	
Coin certificates	30,230,100 00	
Old demand notes	66,907 50	43,780,021 30

Leaving a balance in excess of all such obligations of	17,378,202 15
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Very respectfully,

LOT M. MORRILL,
Secretary.

Hon. MILTON SAYLER,
Speaker pro tempore House of Representatives.

